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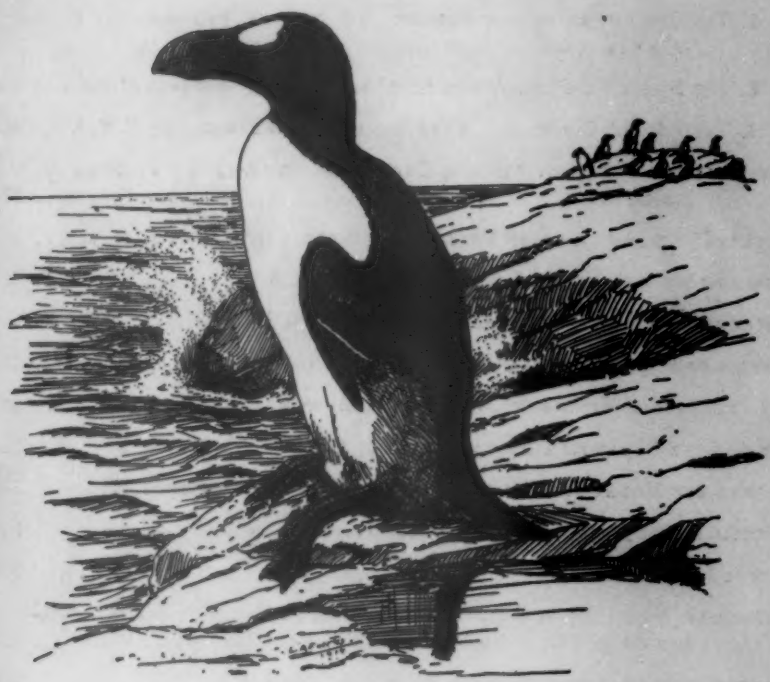

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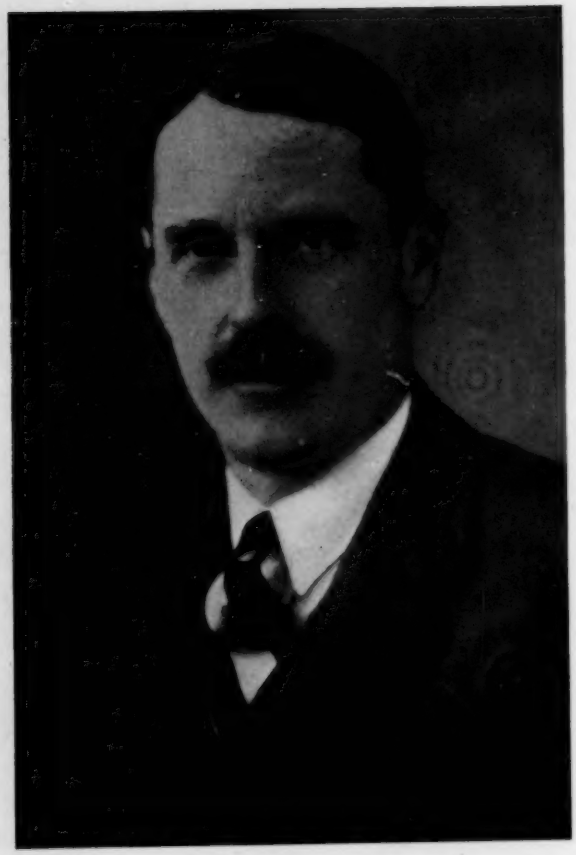

John C Phillips

UNIV. OF MICH.

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IN MEMORIAM: JOHN CHARLES PHILLIPS, M.D.

BY GLOVER M. ALLEN

Plate 8

AT rare intervals in a lifetime one finds a man who corresponds to one's cherished ideal; who at each contact rings true and clear; who seems, as Marcus Aurelius said, to 'live with the Gods.' John Phillips was such a one. Endowed with high qualities of mind and spirit, imbued with a keen sense of human responsibility and a desire for service, he measured up to lofty standards. Tall and lithe of figure, with clear-cut handsome features, and a merry twinkle in his dark eyes, he was a personality to be remembered for his quiet force, a straightforwardness that could countenance no sham, and an earnestness of purpose that without show or apparent effort accomplished great things.

Bred to wealth and position, he carried forward the best traditions of his New England heritage. He was born in Boston, Massachusetts, on November 5, 1876, the son of John Charles and Anna (Tucker) Phillips; he was a great-grandson of John Phillips, first Mayor of Boston, and a great-nephew of Wendell Phillips. He prepared for college at Milton Academy and graduated from the Lawrence Scientific School of Harvard University in the Class of 1899, thus continuing the long line of Harvard graduates that his forbears had created, beginning with Samuel Phillips of the Class of 1650. His serious interest led him to enter the Harvard Medical School, from which he received the degree of M.D. in 1904. After graduation he acted as House Officer at the Boston City Hospital for two years, thereby gaining further experience, but he never practiced medicine in a professional capacity. On January 11, 1908, he married Miss Eleanor Hyde of Bath, Maine. Two sons and two daughters, their children, survive him, as do his wife, two brothers and two sisters.

From his youth Dr. Phillips was keenly interested in outdoor life, particularly in hunting, fishing, canoeing, and this soon developed into a love

of intelligent travel which often led him in later years to far horizons. Always his journeys had in view a first-hand acquaintance with natural conditions in distant regions, and the pursuit or observation of wildlife. He appears to have kept a journal of important events from boyhood, and in 1915, he published his 'Boy Journals, 1887–1892' in a very small edition for private distribution. This valuable habit no doubt made easier the frequent preparation of brief accounts of his observations and reflections. In various shorter journeys he visited many parts of the western United States and Canada, and in 1900 published a short account of his first bighorn-sheep hunt in Wyoming. The region of the present Glacier National Park attracted him long before it was thought of as a public reservation, and several of its prominent geographic features now bear the names he gave them. In 1896, while still in the midst of his college career, he accompanied Peary as far as Greenland, on one of the North Polar expeditions. Ten years later, we find him with his friend Theodore Lyman, visiting Japan and Korea, with a digression into South China to hunt tiger. More serious expeditions he undertook in 1912–13 to the Blue Nile valley and the borders of Abyssinia (now Ethiopia), and in 1914 to Sinai and Palestine, bringing back important collections of birds and mammals which he presented to the Museum of Comparative Zoölogy. Other travels took him to out of the way corners of North America: Newfoundland, Alaska, Lower California; he spent part of a winter in hunting mountain lions and peccaries in the mountains of Arizona, and in 1938 with Dr. Thomas Barbour, visited Cuba and Florida. His last extensive expedition was in 1923–24, when with his wife and son, John, he traveled through Kenya Colony, to Uganda and the eastern Belgian Congo, partly with a view to seeing the African game fields, with their contrasts of plain and forest. He was the first secretary of the Harvard Travellers Club, organized in 1902.

It was my own good fortune to have accompanied Dr. Phillips on his Blue Nile journey, now well over a quarter of a century ago. The memories of that trip, in spite of its many difficulties, still remain an abiding delight, quite as much for the joy of association with one of his genius as for the added knowledge of this part of the earth. For Dr. Phillips took a keen interest in the things he saw, whether his fellow men, the wild game, or the glorious country. As a campmate his even temper and bright sense of humor helped to carry over temporary discomforts. I well recall our first day out with camels—it was Christmas—and his amusement at the announcement of our absurd little 'dragoman' George: 'Sir, it is very wonderful what has happened to our lunch.' It seemed that stray dogs had made way with it during the previous evening. Thereafter, the task of provisioning was not left wholly to George. Although Dr. Phillips enjoyed the

thrill of good hunting, he cared little about the shooting of animals for trophies, but preferred that the game he secured should be properly preserved for museum study.

Following the outbreak of the Great War, Dr. Phillips felt that his medical knowledge should be turned to account to help his fellow men, with the result that in November 1915, he joined the Second Harvard Surgical Corps for service abroad. He was commissioned an Honorary Lieutenant in the Royal Army Medical Corps and assigned to General Hospital No. 2 of the British Expeditionary Force. On the completion of that service he returned home, but in September 1917, with the entrance of this country into the struggle, he was given a commission in the United States Army Medical Corps as First Lieutenant. In December of the same year, he was made a Captain, and in May 1918, as Major, he was appointed Commanding Officer of the 33d Field Hospital of the Fourth Regular Army Division. He took part in three important offensives in France and afterward was with the Army of Occupation in Germany. He returned to the United States in July 1919, after twenty-six months of war service, of which fourteen were spent in France and Germany.

The wide extent of Dr. Phillips's interest in natural history is well reflected in his published writings, a list of which he prepared and issued in 1933. A glance at this list with its 169 titles, to which he later added 35 more, reveals the progress of his thought from matters concerning hunting and field observation to more serious studies of problems in genetics, with occasional faunal and systematic papers, especially on the ducks and geese, while in later years the difficulties and needs of conservation became increasingly matters of concern. Foremost in his interest were the waterfowl. On the shores of Wenham Lake, bordering his beautiful estate, he maintained a ducking stand where annually he followed the arrival and departure, the changes and fluctuations in numbers of the many ducks and geese that stopped there on passage. Shooting was a passion with him, not only of waterfowl but also of upland game. With a well-trained dog, he delighted to tramp the covers for woodcock or grouse, enjoying quite as much the exhilaration of being in the fields and woods as the thrill of an occasional successful shot. Always he was a 'sportsman' in the best sense, believing in fair play for the game, moderation in hunting, and careful protection where conditions showed the need. Natural resources he regarded as a heritage to be enjoyed legitimately, administered wisely, and handed on to the coming generations with the least impairment possible. In this, unfortunately he often found his fellow sportsmen far less openminded, a state of affairs that frequently called forth from his pen straight-flung words of warning and protest against short-sighted policies.

In his bibliography, the first item was a short account in 'Forest and

Stream' for 1900 of his first hunt for bighorn in Wyoming; this was followed by other notes in the same journal on night-hunting for Black Duck, the game value of the newly introduced pheasants, the game animals of Glacier National Park, and notes on the habits of moose. In 1910, appeared his first article in 'The Auk,' a paper on the autumnal migration of Canada Geese in Massachusetts, and in succeeding years there followed other papers on the waterfowl migrations. In these years, too, he carried out several interesting experiments with the collaboration of Professor W. E. Castle in transplanting germinal tissue in guineapigs, and up to the outbreak of the War, he made a number of valuable studies on hybridization in ducks and pheasants. He maintained for a number of years a large collection of living waterfowl, pheasants, and cranes at his Wenham estate, finding much of scientific as well as esthetic interest in the characteristic behavior and appearance of these handsome birds. With an ever-increasing appreciation of the needs of conservation, we find him from 1915 onward, preparing frequent communications on such subjects as the suggested introduction of ibex into our Southwest, the opposition to the new Federal Migratory Bird Law, propagation of game, the need of sanctuaries, cruelty in sport, the sportsman and the 'zoöphile,' the legitimate use and encouragement of wild-life resources. His special interest in ducks at length bore fruit in the production of his four splendid quarto volumes on 'The Natural History of the Ducks,' 1922–26, in the preparation of which his thoroughgoing method of work was evidenced in the employment of a skilled linguist for several years in the culling and transcription of important published notes from scientific and other publications in nearly every European language. The expense of this publication with its handsome colored plates he largely bore himself. His versatile mind appreciated also the historical aspects of natural history, a viewpoint that led him from time to time to publish in book form a number of valuable records that otherwise might have been lost to sight, among these, excerpts from George Washington's journals concerning the sporting activities of that Great American, the fishing adventures of John Rowe of Boston drawn from the eighteenth-century diaries of that gentleman, the 'Shooting Journal of George H. Mackay, 1865–1922,' and an account of shooting stands in eastern Massachusetts, to be followed later by a collection of 'Classics of the American Shooting Field' and other sporting sketches including a sumptuous small volume, his final one, on the history of Wenham Lake, that came out shortly after his death. Perhaps one of the most valuable of his later works was a bibliography of books concerning American game mammals and birds published between 1582 and 1925, a compilation that will prove increasingly useful as future workers endeavor to review the past history of these species. In 1930, he published in collaboration with F. C. Lincoln, an important book on 'American Waterfowl' summing

up the present situation and speculating on the outlook for the future. All this and much more, reveals his intense concern in matters pertaining to the welfare of game animals and, more especially, the alarming destruction of natural resources in modern times and the urgent need for reforms. He appreciated good writing and in his own works strove to cultivate accurate expression with well-rounded form. In surveying his well-chosen library of books on sport and natural history, he commented on the ragged-looking shelf of American books on hunting and exploration in comparison with the more sumptuous works of many British writers.

A complete account of Dr. Phillips's public service would be a lengthy chronicle. He was Research Curator of Birds in the Museum of Comparative Zoölogy, and at various times made generous gifts of specimens to that institution, including a splendid collection of horns and antlers of game mammals, among them a number of record heads, which he had brought together over many years. He was a member of the Faculty of the Peabody Museum in Cambridge since 1931, and for several years was President of the Board of Trustees of the Peabody Museum in Salem. His interest in the Boston Society of Natural History extended over a long period and he was in recent years one of its Trustees. He was Chairman of the former Massachusetts Conservation Council and for six years President of the Massachusetts Fish and Game Association. He was a founder and for seven years, Chairman of the American Committee for International Wild-life Protection; while as 'American Observer,' he attended several International Conservation Conferences abroad, thus devoting in the aggregate, a large portion of his later effort to the cultivation of a wider appreciation of the meaning and requisites of 'conservation.' In 1919, he was elected a member of the Boone and Crockett Club, of which he served as Vice-president from 1928–32, and was for a number of years a member of its editorial board. He first became a member of the American Ornithologists' Union in 1904 and was elected a Fellow in 1925. He was an honored member of the Nuttall Ornithological Club, though he seldom found it possible to attend its meetings, and at the time of his death was a director of the National Association of Audubon Societies.

Withal Dr. Phillips was an extraordinarily modest and self-effacing person. He disliked all appearance of notoriety, and could only with great difficulty be persuaded to give a 'paper' or any account of his work before public or private gatherings. Yet he was fearless in the proper expression of his disapproval of any pernicious practice and exerted a strong influence in securing the passage of certain needed legislation by Congress.

In his later years he spent his winters with his family at Seven Oaks Plantation on John's Isle, South Carolina, where the milder seasons placed less of a strain on his system, after a winter of illness. He wrote me of

canoeing up to a sleeping alligator and of enjoying the flowers while we in New England were still under snow. On November 14, 1938, he was grouse hunting in southern New Hampshire with a friend, when he died suddenly of heart failure just as his dog came to a point and ere the bird flew. Wise, generous, talented, he strove all his life to give freely of his best, in a high spirit of service. For his shining example the lives of us all are richer.

(Acknowledgments are due to Dr. Thomas Barbour for his kind permission to draw for various facts upon his memorial of Dr. Phillips, privately printed in January 1939.)

THE YELLOW RAIL IN MICHIGAN

BY LAWRENCE H. WALKINSHAW

Plate 9

A COMPLETE summary of the Michigan records of the Yellow Rail (*Coturnicops noveboracensis*) was published by Norman A. Wood in 1909 when he stated: "The Yellow Rail has so seldom been recorded from Michigan that, as I have recently obtained some additional data on its occurrence in the state, it seems advisable to publish these in connection with the review of the literature on the subject. In Michigan, as in neighboring territory, owing to its rareness, secretiveness, or both, very little is known of the habits or local distribution of this species." He summarizes the literature as: Boies, 1875; Covert, 1881; Gibbs, 1879, 1890, and 1898; Miles, 1861; Sager, 1839; Steere, 1881; and Taverner, 1908.

Bradshaw Swales (1912) recorded a specimen from Detroit and Barrows (1912) added a few additional notes about the species. He also stated: "This little rail is one of the rarest of the family in Michigan and specimens are far from common in our museums." Norman Wood (1922) collected another specimen from Berrien County in 1920 and one from Keweenaw County, the first for the Upper Peninsula, in 1931. F. W. Rapp (1931) published three records for Vicksburg, Kalamazoo County. There is a specimen in the Kent Scientific Museum at Grand Rapids taken at Fish Point, Tuscola County, by E. A. Hyer on May 7, 1927.

My personal observations of the Yellow Rail started in a unique manner. On April 30, 1933, planning to search the large Convis Township marsh in Calhoun County for the nest of the Sandhill Crane (*Grus canadensis tabida*), C. J. Henry and I entered from the east where we were joined by Mr. and Mrs. N. T. Peterson, Mrs. L. C. Nielsen and Mrs. Alfred Steinel. We crossed a mile of damp grass and sedge (*Carex*) grown marsh, and were approaching the central part, an area of deeper water, when a single crane rose from its nest and two eggs. Not wishing to disturb the bird for very long, we soon started back, flushing as we entered the drier area, a bird which none of us had ever before observed. It rose from almost underfoot and, flying weakly, dropped out of sight in the thick sedges about thirty feet in front of us, showing a great deal of white in the wings while flying. It was very yellow in color and behaved like a rail. Wishing to collect it, C. J. Henry and I rushed forward to where it landed but found only a rattlesnake. Expecting to flush it, I shot the snake, yet the bird did not fly. Then the six of us paced over an area about twenty feet square for about fifteen minutes, searching through all of the sedges and grasses carefully. Thinking it must have hidden ahead, we were about to leave when

on parting the sedges, we exposed the bird squatting motionless on the ground. It was only necessary to bend over and pick it up: a handsome male Yellow Rail.

Realizing that we did not have much chance of flushing a bird as we had done in 1933, A. B. Chanel and I visited the same area May 6, 1934, with his springer spaniel. We camped all night on a small dry peninsula, crossing, at the first indication of dawn, the same location as the previous year. Within ten minutes two Yellow Rails flushed at the same time in front of the dog, then almost immediately, another, and later a fourth. Subsequent incidents during the year satisfied me that a dog was absolutely necessary in Yellow Rail study. All but three of my other observations were made with the use of a dog.

MIGRATIONS

Many authors state that Yellow Rails are much easier to find in the autumn than in the spring but I do not agree with this. The sedges, reeds and grasses are so much higher in the autumn that not only is the going very hard for the dog but also the birds have better cover in which to hide. In the spring they have to fly when the dog approaches too closely.

The following dates in Michigan may probably be considered as representing the spring migration: BERRIEN COUNTY, May 6, 1920 (N. A. Wood); OTTAWA COUNTY (Holland), April 21 and 28, 1896 (A. C. Baumgartel); CALHOUN COUNTY (Convis township), April 30, 1933, May 6, 1934 (April 27, 1935, Bedford township), May 2, May 16 and May 19, 1935, April 19, 1936, April 18, April 25, May 23, 1937, April 28, 1938; JACKSON COUNTY (Leoni township), April 28, May 9 and May 30, 1935, May 3, 1936, May 2 and May 20, 1937; CLINTON COUNTY (Bath township), May 5, 1935, April 29, 1937, and April 24, 1938; WASHTENAW COUNTY, April 19, 1925 (N. A. Wood and A. D. Tinker); WAYNE COUNTY, March 25, 1908 (P. A. Taverner) and April 22, 1911 (Bradshaw Swales); TUSCOLA COUNTY (Fish Point), May 7, 1927 (E. A. Hyer). In addition to the above records for the Lower Peninsula, I have observed the species in the Upper Peninsula during 1937 in SCHOOLCRAFT COUNTY as follows: Manistique township, Sections 26 and 35, T. 45 N., May 6, twelve observed; Doyle township, Section 32, T. 45 N., May 10, three observed, May 11, eight and May 12, two.

In the fall there appear to be no migration dates for the Upper Peninsula of Michigan but the following are at hand for the Lower Peninsula: WASHTENAW COUNTY, September 13, 1877 (A. B. Covert), September 30, 1908 (N. A. Wood); JACKSON COUNTY, September 24, 1936 (L. H. W.), September 30, 1936 (J. Van Tyne), October 4, 1936 (L. D. Case and A. E. Staebler); CALHOUN COUNTY, October 4, 1935, September 17, 1936, and September 12, 1937, in Convis township; and September 30, 1937, and October 1, 1937, in

Bedford township; KALAMAZOO COUNTY, October 19, 1890 (Morris Gibbs), middle of September, 1900 (Morris Gibbs), October 18, 1912 (F. W. Rapp), October 24, 1913 (F. W. Rapp), September 16, 1924 (F. W. Rapp). Unless observer's name is given, observations were made by the author.

NESTING

Jerome Trombley evidently found a nest of the Yellow Rail May 29, 1894, in the township of Ida, Monroe County (Barrows, 1912). It is possible that the bird observed May 30, 1935, by Homer Bradley and myself in Jackson County may have been breeding. However, I feel sure that the majority of the Yellow Rails move farther north than southern Michigan to nest. I have never observed a Yellow Rail during June, July or August in the Lower Peninsula. In the Upper Peninsula they evidently breed more commonly, yet the nests are very hard to find with the result that only one has ever been discovered. N. A. Wood collected a specimen in Keweenaw County, June 9, 1931 (Wood, 1932). The species was abundant on the Seney marshes in Schoolcraft County during May 1937, and probably breeds there.

Arriving at Munuscong Bay, Chippewa County, in the Upper Peninsula on June 7, 1934, I was very much surprised to see two specimens, a male and a female, taken the two days previous on that marsh by Francis C. Gillett in front of his dog. The female contained an egg measuring 7.6 mm. This was certain evidence of breeding so we decided to search the few days which I spent there for a nest of the Yellow Rail. Early on the morning of June 8, I went toward the east and heard a peculiar ticking with which I was not familiar. It could be heard from at least three different places, but I was unable to flush any birds to prove the author. The next morning, without a dog, I did flush two Yellow Rails at once from one of these ticking areas. I also heard two others. On June 10, four were heard; June 11, four more; June 12, six, two of which were flushed and one male was collected. The gonads were very large in this specimen. On June 13, I lost a film from my Graflex and spent much time searching for it. Late in the afternoon I met Gillett coming out on the marsh as I returned to get a bite to eat. He journeyed down toward where I had lost the film and his dog pointed a Yellow Rail's nest with ten eggs. We placed a blind at the nest and although I flushed a bird five feet from there on June 14, she finally deserted the eggs. I brought some of these back with me and placed them in an incubator at the W. K. Kellogg Bird Sanctuary, knowing that the downy young had never been seen, but they failed to hatch. The remainder were sent by Gillett to the University of Michigan Museum of Zoology. This nest was located in a dense mass of fallen rushes (*Scirpus validus*), with a thin layer beneath and a much heavier and thicker mass above. The

ground was covered at that time with green moss directly beneath the rushes and the outer part of this nest consisted almost entirely of this moss over which was a coarse lining of *Scirpus validus*, mostly of parts near the head. The lining also consisted of a great deal of moss. Within two inches of the nest were some smaller sedges (*Carex pairea*) but the rushes predominated. Through the rushes there was no standing water but underneath the moss was damp. The measurements of the nest were: 100 by 114 mm. outside, 70 by 75 mm. inside, and about 30 mm. in depth. The eggs, creamy-buff in color, were paler than those of the Sora (*Porzana carolina*) yet slightly darker than those of the Virginia Rail (*Rallus limicola limicola*). They were capped at the larger end with thick reddish-brown spots. Three eggs measured: 28.5 by 21 mm., 30 by 21.5 mm., and 29.5 by 21 mm. My vacation time expired on June 15 so that I had to leave the area. Downy young were captured on July 25 by Francis Gillett, Drs. Josselyn Van Tyne and Max M. Peet at the same area. They also collected four adult specimens.

In June 1935, I returned to the same area with my dog but failed to find any signs of the Yellow Rail during the first twenty days. None was heard and none was flushed by the dog. Why the rails should nest there one year and not the next is a mystery to me.

WEIGHTS AND MEASUREMENTS

A number of Yellow Rails which I have captured have been weighed and measured then released. Several have been taken as specimens which were also weighed when taken. Several other specimens in the University of Michigan Museum of Zoology have on their labels the weight and bill color. With the kind permission of the Museum and of Dr. Josselyn Van Tyne the following summary is made:

Males

Date	County	Museum number	Wt. in grams	Wing mm.	Culmen mm.	Bill color	Collector
9–29–1908	Washtenaw	36154	—	93	12	—	J. Bogle
5– 6–1920	Berrien	53605	—	91	15	—	N. A. Wood
6– 9–1931	Keweenaw	67338	—	88	14.5	1	N. A. Wood
4–30–1933	Calhoun	74776	—	91	14.5	1	C. J. Henry, L. H. W.
6– 5–1934	Chippewa	73797	—	88	13	1	F. C. Gillett
6–12–1934	Chippewa	84611	—	84	15	1	L. H. W.
5– 5–1935	Clinton	84610	63.0	88	15	3	F.C.Gillett, C.J.H.
4–18–1937	Calhoun	Nat. Mus.	52.5	83	15	4	L. H. W.
4–25–1937	Calhoun	91277	60.0	93	14	2	L. H. W.
Average of males			58.5	88.77	14.2	1.8	

Females

3–25–1908	Wayne	49305	—	80	14	—	P. A. Taverner
6– 6–1934	Chippewa	73798	—	91	14.5	1 or 2	F. C. Gillett
6–26–1934	Chippewa	74293	49.3	82	13	5	J. VanTyne
4–28–1935	Jackson	84409	47.8	87	—	5	M. Trautman
5– 5–1935	Clinton	91926	42.1	85	12.5	4	L. H. W.
9–17–1936	Calhoun	83549	42.1	87	13	4	L. H. W.
9–17–1936	Calhoun	83550	44.2	86	13	4	L. H. W.
9–30–1936	Jackson	83691	50.1	84	—	4	J. VanTyne
Average of females			45.9	85.25	13.3	4	

Released Banded Birds

		Band No.					
4–27–1935	Calhoun	34–218936	44.0	86	16	3	L. H. W.
5–16–1935	Calhoun	34–218937	—	—	—	5	L. H. W.
10– 4–1935	Calhoun	34–218946	37.9	83	10	5	L. H. W.
4–18–1937	Calhoun	34–334124	50.3	89	15	2	L. H. W.
4–25–1937	Calhoun	34–334114	63.8	82	15	2	L. H. W.
4–25–1937	Calhoun	34–334115	65.4	92	15	4	L. H. W.
5–11–1937	Schoolcraft	34–334118	63.2	88	15	2	L. H. W.
5–11–1937	Schoolcraft	34–334119	48.3	85	13	4	L. H. W.
5–23–1937	Calhoun	34–334120	54.2	81	14	4	L. H. W.
Average of 26 birds			51.6	86.68	13.9		

The wing measurements were taken with a straight-edge ruler from the bend to the tip of the longest primary. In bill color: 1, stands for a uniform dried corn-yellow color, more yellowish in life; 2, for yellow with the tip of the maxilla olive; 3, yellow with the tips of both maxilla and mandible olive; 4, with a basic line of yellowish or lime green of varying width, and the remainder of the bill olive black in color; 5, with the entire bill of an olive-black color.

Dr. Josselyn Van Tyne kindly submitted bill colors of two females collected by himself as recorded directly from Ridgway's 'Color Standards and Color Nomenclature': No. 74293, U. of M. Mus. of Zool., June 26, 1934, bill color, olivaceous black, legs and feet drab; No. 83691, U. of M. Mus. of Zool., September 30, 1936, bill, olivaceous black (base of mandible and lower base of maxilla, yellowish olive); legs and feet drab. Milton Trautman also submitted colors as recorded from same color guide for the specimen No. 84409, U. of M. Mus. of Zool., taken by him April 28, 1935: female, bill dark olive, lime green at base; legs, cinnamon drab.

The marked variation in bill color is evidently a sexual characteristic as well as one of age. One notes in the accompanying table that males have on the average much lighter bills than do the females yet one summer female had a bill almost entirely yellow. Five April, May and June males had bills entirely of a dried corn yellow. One autumn male had an olive-black bill. Three spring and summer females had bills entirely olive black, while, with the exception of the one mentioned above, the rest had very

dark bills. Three of these, however, were autumn birds. One very light-weight bird, evidently a bird of the year, had, in October, a bill of darker color.

There seems to be no apparent sexual variation in the plumage of the Yellow Rail but there is a marked variation between individuals. Evidently summer birds of both sexes are much more yellow. T. S. Roberts (1932) describes this as tawny-yellow and is one of the few men to describe the plumage of the Yellow Rail correctly. Autumn specimens are usually darker with many white-tipped feathers. Often smaller birds (which are also lighter-weight birds and probably young birds) have these white-tipped feathers on the top of the head and the back of the neck as well as on the back and on the coverts, scapulars, tertiaries and tail coverts. Of two female specimens collected at Munuscong Bay, Chippewa County, in June 1934, one was much darker than the other and very different in appearance. Both were evidently breeding birds. It will require more specimens to show the cause of this variation.

Although only a few specimens have been weighed in the flesh, one notes that the males are the heavier. The three males were all taken in the spring and averaged 58.5 grams, or 13.7 grams per bird heavier than three spring females. Three spring females averaged in weight 44.8 grams while three autumn females averaged 44.1 grams. Measurements show the males to be larger also. In taking the length of fresh birds, two spring males averaged 164.5 mm., while three females averaged 148.6 mm.

VOICE

P. B. Peabody (1922) thus described the voice of the Yellow Rail: "This note may be almost perfectly imitated by tapping a hollow beef-bone with a bit of iron. The usual rhythmic form of the call is, - -, - - -/- -, - - -/- -, - - -, etc." This rhythmic procedure was often heard at Munuscong during June 1934, and was heard in Jackson County during May 1935 and 1937, and in Schoolcraft County during May 1937, but it was not always the same perfect rhythm. The number of clicks between pauses was variable. Especially was this true when I listened in Schoolcraft County to several birds immediately around a blind within which I was located. Some birds gave only two clicks between pauses and had only a few groups of ticks at one utterance, such as, *tick-tick- -tick-tick*, pause, *tick-tick- -tick-tick*. Fryer (1937) recorded the rate of ticking for June 29, 1933, after 10.40 p. m. in southern Manitoba. He said, ". . . at this point I clocked the ticking for five minutes. The rhythm of *tick-tuck, tick-tick-tick* was perfect until the sixth minute, and the following were the number of sets per minute (five notes per set); 53, 57, 63, 55, 58. Thus in five minutes it gave 286 sets or 1430 notes. On one occasion it ticked incessantly for 17 minutes."

As stated by both Fryer and Peabody the Yellow Rail ticks considerably during the night on the nesting area. It also ticks a great deal during the daytime. I have heard it every hour of daylight at Munuscong Bay (June 1934) in Chippewa County. It was given oftener during early morning, late evening or on cloudy days. One could start a group of tickings almost any time by passing through certain areas. At night, by throwing a stone into the marsh water, one could start a number of birds ticking near at hand. The notes are very distinctive and serve to identify the Yellow Rail whenever heard.

Ames (1902) recorded the call as *kik-kik-kik-kik-queah* from a captive bird but I have never noted this ending in any of the calls heard.

A call given on two occasions by different birds which I had captive for several hours was a harsh *kaaaa* similar to the call of the Bronzed Grackle (*Quiscalus quiscula aeneus*). It was given when I cornered the birds with my hands.

BEHAVIOR

The Yellow Rail prefers the drier parts of the larger grass- and sedge-grown marshes but may at times be found during migration where water is several inches deep. The chief characteristic behavior of the bird is its secretiveness, for it spends much of its time beneath the rank dense vegetation of the marshes which it inhabits. Rarely does it fly, but rather resorts to escape by running or more often by hiding. Many times I have entered a marsh with my dog without the least evidence that there was a single Yellow Rail on the whole area, yet, before leaving, as many as twelve birds were sometimes flushed ahead of the dog.

By watching the dog work a fresh scent one notes the course pursued by a rail. Usually this covers several square rods. As soon as the dog approaches too close the rail rises, often within a few feet, to fly from fifty to three hundred feet. By watching closely and keeping the eye on the spot of landing, the chances are very good that one will either flush the bird from this spot or catch it. If it flies a second time, the flight is much stronger and farther. But, if this time one notes only the general region of landing, by working the dog over the area, the bird will fly even more readily and much farther so that it seldom is caught. Often on this third flight the bird lands in dense shrubbery. In covering the distance between landing spots, one can arrive most accurately by running, getting there as soon as possible, keeping the eyes riveted on the spot of landing. At times this has proved rather inconvenient. Once, with three Yellow Rails in my pockets and the scales back near the edge of the marsh, I flushed a fourth, immediately starting the chase. When it was captured, the three in my pockets were gone but they had all been banded. Birds in migration appear less willing to fly than those on the nesting area and do not fly so far when flushed.

The flight is much like that of the Sora (*Porzana carolina*) but is weaker and not continued so far. Slow at rising and in flight, the bird flies with legs dangling and can then be identified easily by the conspicuous white secondary regions on each wing. The Virginia Rail (*Rallus limicola limicola*) at a certain angle shows white in flight but on the bend of the wing. This species is somewhat larger and darker than the Yellow Rail. On longer flights the Yellow Rail appears much stronger, often leaving the sedge-covered areas so often inhabited for brushy areas bordering, while on these longer flights they are swifter and appear to carry the feet behind rather than dangling below. Often when landing the bird will roll over and over before righting itself.

When released, often the Yellow Rail will not fly, but will walk ahead of one. Often I have walked as much as fifty feet behind a bird, photographing it and watching its behavior. As a rule they walk rather jerkily but again are very swift. One must keep his eyes upon the area almost continuously or he will be unable to see the bird when he raises his eyes to peer at the spot where it had previously stood, so good is the protective coloration. I have occasionally seen the Yellow Rail land in open water when flushed. They are good swimmers but speedily depart for bordering cover.

On the nesting area birds were usually flushed in pairs. If a ticking area was located this usually proved to be the case, even though only one bird might be ticking. By no means are all birds flushed. Once, where a bird had landed, my dog sniffed underneath a large mass of dead fallen-down sedges, and as he did so a Yellow Rail's head protruded from the other side of the clump. The dog, not getting the scent, withdrew his nose sniffing underneath another group. Immediately the rail drew back underneath the mass and there I captured it.

During the spring of 1938, my trained rail dog was killed by an automobile and I purchased another dog. This one, although only a year old was able to flush both Sora and Virginia Rails but even if crossed over areas where Yellow Rails were ticking he was unable to flush them. He was only slightly interested even though I kept him there by means of a leash. The birds stopped ticking only as long as we were in their immediate vicinity, but resumed it at once when we retired a short distance away.

I once found two dead Yellow Rails where some hawk or owl had captured them. Beside the remnants of one was an owl pellet which contained many feathers of a Yellow Rail. Marsh Hawks (*Circus hudsonius*) and Short-eared Owls (*Asio flammeus flammeus*) are often found on the area, both coursing a few feet above the sedges in quest of food.

I have watched Yellow Rails, when released, eat small snails and insects from the sedges through which they proceeded. In most stomachs examined, snails were found. Often seeds of sedges were also found in stomachs as well as some pieces of gravel.

DISTRIBUTION

In the Upper Peninsula the Yellow Rail is the most abundant of the rails in so far as my observations are concerned. During the time spent there in June 1934, June 1935, and May 1937, 136 rails were observed or heard; of these 64 were Yellow Rails, 48 Virginia Rails and 24 Soras. In percentage 47 per cent were Yellow Rails, 35 per cent Virginias and 18 per cent Soras.

During April and May 1934–35–36–37–38, the following rail observations were made in Eaton, Barry, Clinton, Jackson, Calhoun and Kalamazoo Counties in the Lower Peninsula. Soras and Virginias were observed in all of the counties and Yellow Rails in Clinton, Jackson and Calhoun. Following is a list of each species by months as observed in these Lower Peninsula counties:

	Virginia Rail					Sora Rail					Yellow Rail				
Year	1934	1935	1936	1937	1938	1934	1935	1936	1937	1938	1934	1935	1936	1937	1938
April	0	31	8	6	19	1	25	1	14	18	0	3	2	12	15
May	3	105	10	9		19	133	24	8		4	14	1	7	
Total					191					243					58

During the same period only one King Rail (*Rallus elegans elegans*) was observed.

The majority of Yellow Rails leave by the middle of May but one bird was observed as late as May 30, consequently the entire month of May was included in the above census. One notes that May 1935, when considerable work was done on both Sora and Virginia Rails, the greatest number of these species was observed.

In percentage observations for April and May during the five years in the Lower Peninsula, 49.30 per cent were Soras, 38.74 per cent Virginia Rails, 11.77 per cent Yellow Rails and 0.20 per cent King Rails.

SUMMARY

The average date of arrival of the Yellow Rail in southern Michigan is during the latter part of April or early in May, occasionally in late March. The average date of departure is late September or early October.

The Yellow Rail breeds in Michigan, one nest having been found in the Lower Peninsula and one in the Upper Peninsula. They nest on the drier marshes. One nest, unlike other nests previously reported, was located in rushes instead of in fine grasses and sedges. The nest was made of these rushes combined with moss.

The Yellow Rail is very secretive and mouse-like, depending more on its coloration and the deep sedges within which it lives for protection than on

flying. With the use of a good dog, however, they can be flushed and easily caught because they fly only a short distance and then depend on their coloration for concealment rather than on escape by running.

The Yellow Rail is not rare in Michigan. In the Upper Peninsula I would consider it the commonest rail. There during May 1937, and June 1934–35, 47 per cent of the rails observed were Yellow Rails, 35 per cent Virginia Rails and 18 per cent Soras. In the Lower Peninsula, south-central part, during April and May 1934–35–36–37–38, 11.77 per cent of the rails observed were Yellow Rails, 38.74 per cent Virginia Rails, 49.3 per cent Soras and 0.20 per cent King Rails.

The average weight of seventeen birds was 51.6 grams; three spring males averaged 58.5 grams; three spring females 44.8 grams, and three autumn females 44.1 grams. Males are the larger and heavier.

The color of the bill varies but the bills of males average lighter colored than do those of females and younger birds. Adults are lighter colored than younger birds and have much more yellow in the plumage.

The call of the Yellow Rail is a distinctive ticking different from the notes of any other marshbird and is uttered on the nesting area during the entire day but chiefly during the early morning and late evening hours and during the hours of darkness.

BIBLIOGRAPHY

AMES, JAMES HENRY
1902. Solution of the "ornithological mystery." Auk, 19: 94–95.

BARROWS, WALTER B.
1912. Michigan bird life. Spec. Bull. Michigan Agr. College, pp. 159–160.

BENT, ARTHUR CLEVELAND
1926. Life histories of North American marsh birds. Bull. U. S. Nat. Mus., no. 135, pp. 316–325.

BOIES, A. H.
1875. Catalogue of the birds ascertained to occur in southern Michigan. Hudson, Michigan.

COVERT, ADOLPHE B.
1881. Natural History "Michigan." History of Washtenaw County, Michigan, pp. 173–194, Chicago.

DUMOND, FRANK L.
1935. Letter: specimen collected by E. A. Hyer, May 7, 1927, at Fish Point, Tuscola County, Michigan; specimen no. 100074 in Grand Rapids Public Museum, Grand Rapids, Michigan.

FRYER, R.
1937. The Yellow Rail in southern Manitoba. Canadian Field-Naturalist, 54: 41–42.

GIBBS, MORRIS
1879. Annotated list of the birds of Michigan. Bull. Geol. and Geogr. Survey Terr., 5: 481–497.
1890. The Yellow Rail, *Porzana noveboracensis* (Gmel.) in Michigan. The Oölogist, 7: 230–231.

NEST OF YELLOW RAIL, MUNUSKONG BAY, MICHIGAN

YELLOW RAIL, A WING-TIPPED MALE

UNIV. OF MICH.

1898. Additions to the avifauna of Kalamazoo County, Michigan. Bull. Michigan Ornith. Club, 2: 7.

MILES, MANLY

1861. Report of the State Zoologist. First Biennial Report Geol. Surv. Michigan, pp. 213–241.

PEABODY, P. B.

1922. Haunts and breeding habits of the Yellow Rail. Journ. Mus. Comparative Oology, 2: 33–44.

RAPP, F. W.

1931. Bird list of Vicksburg, Michigan (Kalamazoo County), p. 8.

ROBERTS, THOS. S.

1932. The birds of Minnesota. Minneapolis, 1: 448–450; 2: 550.

SAGER, ABRAHAM

1839. Report of Dr. Abraham Sager, Zoologist of Geological Survey. House Doc. State of Michigan, pp. 410–421.

STEERE, J. B.

1881. The migration of Michigan birds. Tenth Ann. Rept. State Horticulture Soc. Michigan, 1880, pp. 115–124.

SWALES, BRADSHAW H., JR.

1912. Yellow Rail. Auk, 29: 100–101, 237.

TAVERNER, P. A.

1908. Four rare birds in southeastern Michigan. Auk, 25: 327–328.

WOOD, NORMAN A.

1909. Notes on the occurrence of the Yellow Rail in Michigan. Auk, 26: 1–3.

1922. Observations on the birds of Berrien County, Michigan. Occas. Papers Mus. Zool., Univ. Michigan, no. 119, p. 10.

1931. Rare birds from Keweenaw County, Michigan. Auk, 48: 616–618.

1932. Birds of Keweenaw Point, Michigan. Papers Michigan Acad. Sci., Arts and Letters, 17: 713–733.

WOOD, NORMAN A., AND TINKER, A. D.

1933. Fifty years of bird migration in the Ann Arbor region of Michigan. Occas. Papers Mus. Zool., Univ. Michigan, no. 280, 56 pp., map.

Battle Creek
Michigan

THE YELLOW RAIL BREEDING IN ONTARIO

BY OTTO E. DEVITT

Plate 10

THE Yellow Rail (*Coturnicops noveboracensis*) has always been a rare bird in Ontario. Taverner (1934) says: "According to actual records, it is one of the rarest birds in Canada." Yet it is widely distributed in summer throughout Ontario and, although it can hardly be said to be plentiful anywhere, there seems to be evidence that it is much more abundant than is generally supposed. Its distribution extends north to Hudson's Bay. At Moose Factory, on James Bay, it is a common bird according to Sam Waller, for several years resident school-teacher at that post. A specimen secured there by Waller on June 2, 1930, is in the collection of the Royal Ontario Museum of Zoology (Baillie and Harrington, 1936).

It has been noted during the breeding season at widely separated localities in the province, from our southern border at Lake St. Clair (Swales, 1912) to James Bay, but no definite evidence of its having bred had been secured prior to 1938. Hutchins's account of a rail breeding near the efflux of the Severn River on Hudson's Bay about 1777 (as quoted by Macoun, 1909) wherein he states: "It builds no nest but lays from ten to sixteen perfectly white eggs among the grass" can hardly be referable to this species in the light of present knowledge. Similar doubt surrounds the statement by Sam Waller that D. Sailless, Indian at Moose Factory, claims to have once found a nest of this rail "containing many eggs."

There are a number of scattered records of the presence of Yellow Rails in migration in the southern part of Ontario. In the vicinity of Toronto, it has been recorded as "a regular fall migrant, rare" by Fleming (1906). A specimen was secured at Toronto Marsh as early as June, 1874, according to Scott (1885), and Fleming records one taken on August 5, 1896, and one taken April 24, 1899. All other occurrences at Toronto, until recently, have been in the fall between September 10 and October 15. The most recent records have come from the Holland River Marsh, some twenty-five miles north of Toronto. This extensive marsh stretches for about fifteen miles in a southwesterly direction from Cook's Bay, Lake Simcoe, and is about a mile across, at its widest point. The marsh was an arm of the former glacial Lake Algonquin. Poor drainage, due to the very slight difference in levels between the source and the mouth of Holland River, has given rise to marsh and bog conditions. Within the memory of some of the older inhabitants, parts of this marsh were covered with water to a depth of several feet. In 1925, much of the western section was drained and the land

HAUNTS OF YELLOW RAIL, HOLLAND RIVER MARSH, ONTARIO

NEST AND EGGS OF YELLOW RAIL

is now being utilized for market gardening; but there is still a considerable area in its original marsh condition.

The first indication that the Yellow Rail was to be found in this marsh came to hand on May 25, 1929, when one was flushed by a group composed of J. L. Baillie, R. J. Rutter and R. E. Bennett, near the top of the sixth concession of King township. The observers had been attracted to it by its repeated 'clickings' in the marsh in daylight (about 6 p. m.). Further occurrences of the Yellow Rail in the Holland Marsh were not reported until May 28, 1937, when R. D. Ussher, while carrying on faunal-survey work in the same general area, heard what he believed was a Yellow Rail. A series of sharp *tik* notes, repeated several times, was heard but a search failed to locate the bird. Returning with D. A. Ross on June 28, Ussher spent part of the night at this spot in an effort to ascertain the author of the sounds. With his kind permission, I quote in part from Ussher's notes. ". . . Back again to same area, in the evening, 9.30 p. m.–12.30, cool and damp. A little light still visible when we reached the plot. We were greeted, presumably, by two Yellow Rails. Their calls *kik-kik*, *kik-kik-kik*, sounded rather like a light hammer driving nails; sometimes it had almost an electric snap. We flushed one on the plot several times. Ross saw white on the wing but I was unable to make it out. We kept after it. The bird would flush and fly a short way, once or twice rising from my very feet. After alighting, it would commence its *kik-kik*, *kik-kik-kik* or occasionally *kik-kik*, *kik-kik*. Ross, imitating the note, had this bird come right up to his feet, answering with a series of low *brrmm* or *glum* sounds each time, especially as it got close."

From this experience it seemed that the best time to hear and see Yellow Rails was at night. Accordingly, R. D. Ussher and the writer visited the same location on July 1, going in about sunset. After walking out several hundred yards into the open bog, which quakes as one passes over it, we imitated the call of the Yellow Rail by striking two metal objects together. Almost at once answering 'clickings' were heard from two different points in the marsh. We approached one of the hidden birds and again imitated the call. The rail answered only a few yards away. By walking quickly in the direction of the sound, we were able to flush it almost at our feet and with the aid of a powerful flashlight obtain a fair look at the fast-disappearing object. The white wing-patches, the small size, together with the very characteristic call left no doubt as to its identity. On July 7, Ussher and Ross heard at least three Yellow Rails 'clicking' at dusk on the north side of Holland River, in Simcoe County, about five miles northeast of the first location.

On July 10, F. H. Emery and the writer, equipped with rubber boots, flashlights and 'clicking-stones,' spent most of the night in the Holland

Marsh, a few miles north of the town of Bradford, in Simcoe County, and about a mile west-by-south of the point where the preceding observation was made. We succeeded in locating at least three Yellow Rails and viewed their flight in the beams of our flashlights. We found that they decoyed easily to any sound even faintly resembling their rhythmic 'clicking.' An instance of this came one night when we had just flushed a rail which we followed in the general direction of its flight. A short time later it was 'clicking' again. We approached cautiously, then stood still, meanwhile giving occasional imitations with the stones. The rail had stopped calling and after a considerable wait we decided it had gone. At my first step, I was surprised to have the bird flush almost at my heels. Apparently it had come up to us out of curiosity, in the darkness.

On the night of July 17, Emery and the writer again visited this section of the marsh. On this occasion we noticed that one particular rail seemed more excitable than usual and 'clicked' continuously. By approaching cautiously and swinging the beam of the flashlight back and forth, the writer succeeded in locating the rail crouched flat on its stomach but facing away from him. It was indeed an unusual sight to observe the object of our search uttering its 'kicker' calls. On July 27, the vigor of the night clicking had started to wane; only two rails were heard and these sounded rather feeble, lacking the snap of former occasions. On July 29, although we imitated the call for several hours, we failed to get a single responding note from the rails. Apparently the 'voice' period had ended with this species for the year. Although no evidence was secured, the continued presence of Yellow Rails in the Holland River Marsh during the summer of 1937 denoted probable breeding. With this thought in mind, it was decided to work toward the possible solution of the problem during 1938.

On April 17, 1938, soon after the snow had gone, the writer visited the marsh near Bradford and placed about twenty-five wisps of old cut marsh grass on slightly raised hummocks, near where we had encountered Yellow Rails the previous summer. It was hoped that one might be enticed to nest under one of them as recorded by Peabody (1922). This experiment was doomed to failure, however, for returning on June 3, with F. H. Emery, we found that the hay had been beaten down flat and, moreover, held no Yellow Rail's nest. Toward dusk our persistent 'clicking' was answered by at least three Yellow Rails. We had just flushed what we thought was a rail when an unusual thing happened. Emery was imitating the note, when a Yellow Rail flew up from the grass and attempted to cling to his coat pocket. Standing but a few feet away holding the flashlight, the writer could clearly see it as it fluttered there for a few seconds, then, failing to get a firm grip, it dropped back into the grass. In the beam of light we could see the tops of the grass moving and presently the rail could be seen as it

moved silently through the vegetation toward us, in the direction of the sound. It seemed to be torn between two urges: one, to advance, the other, a sense that danger was near and it should flee. Hence, its approach consisted of a series of short runs, first toward us and then a hasty retreat, to be followed by another approach. As it passed below the writer toward Emery, I dropped my hat over it and soon had it in my hand. Its only outcry was a short mouse-like squeak. It was quite gentle and made no attempt to bite. This bird was kept in captivity by Mr. Emery for nine days in an effort to learn something of its habits. It partook readily of earthworms, mealworms and freshwater snails. At no time during its captivity was it heard to make any sound. Although eating well, it died suddenly on June 12, without apparent cause. Subsequent dissection showed it to be a male. The specimen was presented to the Royal Ontario Museum of Zoology.

On June 12, R. D. Ussher and the author visited the marsh at midday and were proceeding across the section where we had recently captured the rail, when Ussher, who was a short distance to my left, flushed a Yellow Rail from the marsh, a few feet ahead of him. It flew off with a rather rapid, direct flight about three feet above the grass tops and dropped into the vegetation, about one hundred feet away. On searching the area around where the bird had risen, the writer was fortunate enough to locate the entirely concealed nest. Apparently the rail had flushed directly off the nest, a very unusual event according to Rev. P. B. Peabody, who in twenty years' experience with this bird had only had this happen once (Bent, 1926).

The nest, the first to be reported for Canada, contained a beautiful set of seven eggs. Six of them were rather uniform in color and pattern, being of a rich, creamy buff, heavily speckled around the large end with reddish-brown spots, in the form of a wreath. The seventh was marked differently, being minutely dotted with chocolate brown over the entire surface, slightly more concentrated at the large end. They measured: 29 x 20 mm.; 30 x 21; 29.5 x 20; 30 x 20; 30 x 20.2; 30.3 x 21; and 29 x 21, respectively. The eggs which were only slightly incubated and the nest are now in the Royal Ontario Museum of Zoology.

The nest was composed of fine blades of dead marsh grass, coiled in the form of a cup. It was built in the center of a dense clump of marsh grass which was fifteen inches in height; the bottom just rested on the ground and the rim about three inches up. The nest measured 3.75 inches across the top; the inside diameter 2.75 inches; the thickness was approximately one inch.

The surrounding vegetation contained much leaning dead grass, which formed a canopy over the nest, hiding it completely. The actual nest was found toward the drier outer edge of the marsh, some five hundred yards from the river. The ground surface at this point appeared to be without

standing water, but under foot pressure about one inch of water was visible. This area was covered with grasses and sedges, an occasional dwarf willow, and a number of other marsh plants. Typical plants in the immediate vicinity of the nest were marsh five-finger cinquefoil (*Potentilla palustris*), bog willow (*Salix pedicellaris*), blue marsh bellflower (*Campanula uliginosa*), cut-leaved water horehound (*Lycopus americanus*), marsh St. John's-wort (*Hypericum virginicum*), buckbean (*Menyanthes trifoliata*), a horsetail (*Equisetum*), the sedge (*Carex flava*), the grass (*Muhlenbergia mexicana*), and *Aster junceus*. This section of the marsh is the favorite habitat for such species of birds as the Short-billed Marsh Wren (*Cistothorus stellaris*), Leconte's Sparrow (*Passerherbulus caudacutus*), Savannah Sparrow (*Passerculus sandwichensis* subsp.), Wilson's Snipe (*Capella delicata*) and Swamp Sparrow (*Melospiza georgiana*).

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SUMMARY

The Yellow Rail is widely distributed throughout the province of Ontario and its appearance during the summer months in favorable localities from Lake St. Clair to James Bay leads to the belief that it is a breeding bird, wherever suitable marshes are to be found.

While it is heard occasionally during the daytime, it becomes much more active just after sunset. The 'voice' period extends at least from May 25 to July 27.

It appears that a reasonably good imitation of the 'clicking' call will decoy the rail to the observer.

The nest, which was in a situation similar to those recorded from North Dakota by Peabody, contained seven eggs on June 12, 1938, and is the first reported from Canada.

LITERATURE CITED

BAILLIE, JAMES L., JR., AND PAUL HARRINGTON
1936. The distribution of breeding birds in Ontario. Trans. Royal Can. Inst., 21: part 1, p. 33.

BENT, ARTHUR CLEVELAND
1926. Life histories of North American marsh birds. Bull. 153, U. S. Nat. Mus., p. 322.

FLEMING, JAMES H.
1906. The birds of Toronto. Canada. Auk, 23: 448.

MACOUN, JOHN AND JAMES M.
1909. Catalogue of Canadian birds, pp. 152–153.
PEABODY, P. B.
1922. Haunts and breeding habits of the Yellow Rail. Journ. Mus. Comparative Oölogy, 2: 33–44.
SCOTT, W. L.
1885. The Great White Egret and the Yellow Rail in Ottawa, Canada. Auk, 2: 110.
SWALES, B. H.
1912. Yellow Rail (*Coturnicops noveboracensis*). Auk, 29: 101.
TAVERNER, P. A.
1934. Birds of Canada, pp. 173–174.

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SYMPOSIUM ON THE INDIVIDUAL vs. THE SPECIES[1]

1.—THE INDIVIDUAL vs. THE SPECIES IN BEHAVIOR STUDIES

BY FRANCIS H. HERRICK

PROBABLY there never was a time within the past hundred years when the individual in relation to the species was not a fruitful subject for discussion. Certainly never were there more field workers in ornithology, and never were living individual birds handled in greater numbers than at the present time. Certain elementary facts about species and the problems to which they have given rise, should perhaps be mentioned. In the biological sense species are abstractions, or ideas expressive of relationship—since the only real or tangible things in the world of animal and plant life are individuals. Yet individuals, through all the spires of form from amoeba to man himself possess, we must believe, individual differences. No one any longer believes that all individuals, belonging to the same species, are cast in the same mold, and it is a fact of everyday experience that individual differences are often inherited.

Discussion of the species question, in some respects, has not advanced very far beyond the ideas expressed by Darwin in the second chapter of his 'Origin of Species,' which was first published seventy-nine years ago. He thought that slight individual differences lead to slightly marked varieties, and these to more strongly expressed and more permanent ones; while the latter are often the precursors of subspecies, and these in turn of true species. Although there may be no universal rule by which species can be certainly discriminated from varieties, Darwin regarded the latter as incipient species, and endeavored to show that species were gradually developed by the selection and accumulation of individual variations from the parent stock, with the aid of isolation. Moreover, in certain genera of both animals and plants variation seems to run riot, although in such cases the making of species may not be very definitely effected, while there are other genera which have been remarkably stable for long periods of time. Although well-marked varieties may be species in the making, unless conditions are favorable they can never reach that goal, but may either be extinguished or endure simply as varieties; as another alternative, Darwin thought that a species and variety might co-exist until both come, in the opinion of some naturalists, to rank as independent species. The species then is a term given to certain kinds of animals and plants, which agree in a number of more or less important characteristics, and are assigned to a more or less definite place between the genus and the subspecies or variety.

[1] Papers read before the American Ornithologists' Union, at Washington, D. C., October 18, 1938.

The worker in the field or laboratory or the systematist in his museum commonly deals with samples only of a species or natural population, the numbers of known individuals of which may be very numerous and widely distributed, or in the case of rare forms, few or even fragmentary. A numerous natural population of wide distribution is not commonly homogeneous, but individuals drawn from different stations are apt to show numerous differences, and may represent local races more or less differentiated from each other. It is therefore obvious that the true history of such a species cannot be known by studying a few individuals drawn from the same environment.

Thus, it might be expected that a full and exact record of the life history and behavior of a single pair of the Kirtland's Warbler, of which but a few thousand individuals are known to exist in a single limited environment, during the breeding season—this history to include the development of the eggs and young—would fairly represent the prime characteristics of this species as a whole; while far different might be the case with the American Robin, in which the total population is to be reckoned, not in thousands, but in the millions, and these distributed, during the period of reproduction, over a vast area, and living under the most diverse environments. To learn the possibilities of such a species, assuredly one would have to travel far and wide, and devote more than one season to careful investigation.

According to post-Darwinian researches, especially those of Hugo de Vries, new species can sometimes arise, not by slow, continuous and progressive changes, but abruptly to form mutations, and certain new forms, especially in plants, are considered to have arisen as the result of crossing. Notwithstanding the embarrassment that was bound to come from sexual dimorphism, which is very marked in the animal kingdom especially, the recognition of species has been usually based upon morphological, that is structural, differences; but divergence from parent stock can also be manifested in other ways, such as geographical distribution, in physiological characters, and probably in phases of behavior; all of which tend to show the arbitrary way in which species have generally been determined in the organic world.

What bearing does all this have upon the relations of the individual and the species in the study of bird behavior? I can answer this question best by illustrations drawn from personal experience, but first let me refer to a little book[1] which I have recently read on 'The Lore of the Lyrebird.' This shy, Australian rarity has been known for one hundred and forty years, but so imperfectly that its relationships have never been determined with certainty, and as recently as 1916 the species (*Menura novae-hollandiae*)

[1] By Ambrose Pratt, Melbourne, 1937.

has been divided into three subspecies, and assigned to an independent order, the Menuriformes. Among the remarkable things attributed to this extraordinary bird, the author states as his personal belief that, "*Menura* is possessed of a highly developed sense of smell by means of which he is warned of the approach of dangerous animals (such as the wild cat and fox, whose odors are offensive), and it is thus able to avoid them; and which, on the other hand, attracts and attaches him to places where flourish Australia's most sweetly scented herbs and shrubs." Having formerly placed its nest at a height of about four feet, after the introduction of the fox, it grew wiser, and went up higher and higher until one nest was found that stood at sixty feet from the ground. Apart from its unsurpassed powers of mimicry, the *Menura* is described as having more than thirteen distinct "conversational" calls; and the author thinks that it possesses the power to impart ideas by a form of speech; its friendship, he says, cannot be won by human beings with tempting offerings of food, as is so often the case with other birds and mammals.

These are some of the inferences drawn by the writer of this little book, but upon what are they based? In the main upon the behavior of a single male Lyrebird, with whom a woman, who lived in the country and had her garden close to the jungle where the Lyrebirds were at home, had formed what looked like a singular friendship. This bird came first for food to the garden where the woman was frequently at work, and then, when familiarity had banished fear, to the porch of her house where it would sing and display its remarkable plumes. Anyone who has seen the peacock or even the turkey cock display at any suitable stimulus need not be greatly surprised at this somewhat similar action.

I mention these things, not so much as a criticism of the author, who is both candid and modest, as to show the necessity of far greater knowledge of a species than is here displayed before its true story can be told or written. I like the author's narrative, but cannot accept his conclusions. One need not be a prophet or a clairvoyant to affirm that when the true history of the Lyrebird is eventually written, it will be fundamentally different from what is here prematurely offered as the truth.

In the study of birds in the field I have been mainly interested in the normal and exceptional behavior of adult and young birds, particularly during the nesting season, as well as in the development of instincts, habits, and intelligence, whether displayed in the nest or out of it. Of course I have been keen to note any departure from what was considered the normal behavior of the species; accordingly I have endeavored to study the nesting behavior of as many different individuals of the same species in different environments as time would permit.

I can now refer to but one of the problems which this work has brought

out, that of nest-building,[1] perhaps the most complex activity, and one which has been the most strangely neglected, in the whole field of bird behavior. The strength and perfection of inherited instinct, experience and habit, the age and sex, the vicissitudes and adaptability of the builder, as well as the character and time of the season in which breeding is accomplished, all enter as factors into the final product,—the nest itself, not to speak of changes which second or later broods may entail. While no two pairs, or no two individuals of either sex, are ever precisely alike, noticeable variations in behavior may seem rather trivial to anyone who has not followed these matters with close attention to detail.

Let us take as a capital illustration of what has just been said the nest-building practices of one of our commonest birds, to which I have already referred, the American Robin. This hardy migrant breeds over most of the vast area between Alaska and the Northern and Middle States of this country, as well as from Labrador through New England to as far south as North Carolina. "The first land-bird seen by me," said Audubon, "when I stepped upon the rugged shores of Labrador, was the robin; its joyful note was the first that saluted my ear." In New England, where I first came to know the Robin, the form and character of its nest are so uniform and familiar that, as Horace Greeley once said of grindstones, it is hardly necessary to picture or describe it. In New Hampshire and Ohio, where I have examined this bird's nests with particular care, the story is simple: dead weeds and grasses of the previous season are used to frame it, damp mud to mold its cup, and fine grass to line it, but the dead leaves of deciduous trees and shrubs so abundant everywhere are lacking. The only 'leaves' to strike the Robin's fancy in these parts are those 'leaves of grass,' the bleached, pliant blades of last-season's growth. Since twigs are usually absent also, the Robin in these sections might be considered a twig- and leaf-avoiding species, quite unlike the Catbird, the Wood Thrush and the Veery, all of which set great store by the old autumnal leaves, and all but the Veery frame their nests in part with twigs.

Now if we pass to a different environment, the Robin in the northern Maine woods takes quite kindly to twigs, but may find in leaf-mold a poor substitute for damp clay; while in Labrador or on the adjacent coast of Canada, it nests in stunted spruces, making a large dense frame of spruce twigs, moss, lichens or other such warming materials, while fine grass-blades and Polytrichum moss form as good a lining as could be desired.

In watching the nest-building behavior of eight different pairs of Robins

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[1] On nest-building in birds, particularly the Robin, see the author's 'Home Life of Wild Birds,' ed. 2, pp. 146–166, 1905; for fuller accounts of the Robin, Red-eyed Vireo and Baltimore Oriole, see Journal of Animal Behavior, 1: 337–373, 1911; and for the Robin, Vireo, Oriole and Barn Swallow, with revisions, see 'Wild Birds at Home,' pp. 173–254, 1935.

in New Hampshire and Ohio, I came across a number of variations or eccentricities, as was to be expected, but can refer to but one of these now. In this instance the pair began building their nest on the top of a shutter of our house in Cleveland Heights, Ohio, on the morning of the 19th of May. When their work was examined at nine o'clock on the following morning the ground all about was sprinkled with the tender new foliage of the silver maple trees which had suffered in a violent storm of the previous night. Presently, as I stood watching the course of events, suddenly this Robin began to perform some quite unexpected and extraordinary acts: the female, who was then the sole worker here, repeatedly dropped to the ground, gathered up the young maple leaves by the beakful, and worked them into the frame of their nest. This was seemingly contrary to all rules of the 'Robin Guild' in this part of the world, for never before had I seen thus used any kind of a leaf, living or dead, larger than a blade of grass. Here then was a bird of a leaf-avoiding species taking a liking to forbidden material, and seemingly she could not get enough of it. This Robin soon showed another trick even more novel and surprising. Instead of going to Mother Earth, the unfailing source of these birds' building supplies, as all normal Robins in this region are supposed to have been doing for ages past, she soon began flying up into the maple trees, snapping off their tender, green leaves, and taking them direct to her nest![1] Unfortunately this bird was given a supply of strips of white cotton cloth, which was seized and conveyed to the nest with such eagerness that with the green leaves the whole affair soon became an unmanageable mess and was eventually abandoned.

Many birds, such as orioles, robins, cedarbirds, and flycatchers are often tempted to build what one might call 'freak nests'[2] when abundantly supplied with colored yarns, string or strips of white cloth. Why, I cannot say, unless it be that at certain times, such birds are particularly susceptible to stimulation from all such materials. If we ask what a bird like an oriole or a robin inherits with respect to the building of nests, I think the simplest answer must be—*definite ways of working, with a predisposition to draw from their environment any available materials suited to their methods and style.* If they happen to favor the stems and blades of dead grasses, it is not from any instinctive or inherited predisposition to use these particular things, but they take them because they are everywhere at hand, and experience has proved them to be suitable to their needs and building methods. At the same time birds are adaptable, and, as in the case of food, they are skilled in the use of substitutes. Certainly the Indian Crow does not inherit any predisposition to build its nest entirely of steel spectacle-frames, yet this is what a bird, attracted doubtless by their metallic glitter and shine, once

[1] See the author's 'Wild Birds at Home,' pp. 181–182, 1935.
[2] Ibid., pp. 250–254.

actually did when it purloined the stock of an Indian optician that was left unguarded outside his shop.

We must remember that the behavior of a bird or mammal, like that of a human being, is a resultant of numerous factors, such as age, environment, instinct, experience, habit and intelligence. We cannot write the true history of any species from a few imperfectly known samples. We must study, handle, weigh and measure many individuals, of different ages, and living under different conditions before we can generalize intelligently about the total population of any one bird or mammal, that is, about a species.

If it is asked how many individuals must be known before we can thoroughly know a species, we cannot answer the question, which is probably unanswerable. It will depend on the species, for which there is no applicable formula, and upon the student, who must use his judgment, which should be grounded in as wide experience as possible. For all such reasons the study of certain species is never likely to produce a closed and finished history. Individual variation will take care of that; and on the whole this is encouraging, since the field is always open for any young enthusiast to make some new discovery.

When we consider the vast number of individuals comprising many of the commonest species, the wide geographical range which they enjoy, together with the adaptability which they so abundantly possess, and never forgetting the grilling tasks required of all who would be thorough as well as accurate, we may be certain that it will be a long time before the last word upon this phase of the species problem has been spoken.

Cleveland, Ohio

2.—THE INDIVIDUAL vs. THE SPECIES IN MIGRATION STUDIES

BY FREDERICK C. LINCOLN

INITIATION of migration studies of individual birds is a definite corollary of the development of the banding method. Previously most contributions to this subject were the result of fortuitous circumstances, and frequently by their very nature, they could be only doubtfully accepted as applicable to the species as a whole or even to that element of the species contemporary with the cited example. Consequently, it is not surprising to note that nearly all the studies made during recent years have been based upon this means of investigation. Although the migratory movements of individual birds have only occasionally been treated as a distinct subject, nevertheless, numerous contributions have been made by both American and European students.

In some respects it is by this contemplation of the known movements of individuals that the migration of birds reveals its great magnitude. The spring and fall movements, considered *en masse*, are spectacular, but they become even more impressive when reflection is given to the travels of each individual that goes to make up the flocks. With some birds that perform long migrations, including most of the shorebirds, it would seem that a considerable part of their lives must be spent in travel at the expenditure of vast amounts of energy. Furthermore, since this almost constant motion unquestionably adds to the hazards of existence of such individuals, so it must also increase the dangers to the species as a whole.

The study of the migration of individual birds shows a change with age, whereas that of the species itself may be resolved into fixed routes, orders, terminals, and dates of arrival and departure. The classic American example, determined through extensive collecting, is the Golden Plover, the adults of which migrate in fall earlier than do the immatures, a large number of which also travel southward by a different route. It is now known that this also is true of several other species of shorebirds and probably of some members of other families. Here, of course, we are considering the species as a whole, but when we study individual birds we find that although a year-old bird may arrive later in spring that those fully adult, the second spring it is itself fully adult and so may arrive at an earlier date at the exact site where it established its first nest. Similarly, its dates of departure for winter quarters undergo corresponding changes.

These facts would seem to indicate that the exact time control is internal and dependent upon gonadal development. In this connection it is worthy of note that Meinertzhagen, writing in 1930 on the birds of Egypt, stated as a general conclusion his belief that although it may be common for the

adults and immatures of many species to start their migration together, it appeared that frequently the stronger adults, particularly the males, would outdistance the others, and possibly made fewer stops en route. He recognizes, however, that in some cases the immature birds migrate before their parents. Weigold, analyzing the data accumulated at the bird observatory on Heligoland, found that during the autumn migration the first arrivals for four species of perching birds and one raptore were immature individuals and that the last of these species to arrive were old males. For twelve other species the immature birds came first, followed by mixed flocks of those that were adult and immature. Among several species of shorebirds he found the order to be: adults only, mixed adult and immature, and a sort of rear guard of adults only.

This variation in migration according to the age of the individual is well illustrated also by the Herring Gull, which has been banded in large numbers throughout its entire American breeding range. Practically all those banded were marked as chicks in their natal colonies, and it has been a conspicuous feature of all Herring Gull bandings that the recovery records showing the greatest distance traveled, are of birds recaptured during their first winter. The returns from two-year-old birds have invariably disclosed greatly reduced distances, and those from fully adult gulls have usually been received from the general area in which the banding was done. In other words, the data indicate that although immature Herring Gulls may be extensively migratory and that yearlings are partially so, the adults are either sedentary or only slightly migratory.

Reference may also be made to the post-nuptial movements of several species of herons. Both observation and banding data have demonstrated that most of the birds that late in summer travel long distances north of the breeding range are young of the year. Practically none of the many young Black-crowned Night Herons banded in Massachusetts and subsequently recovered in Maine, Ontario, Quebec, and the Maritime Provinces were two-year-old or adult birds. The Little Blue Herons that every summer are locally common from Maryland and Virginia north to New England are chiefly immature, as shown by their white plumage. Strangely enough the young Night Herons raised at colonies in the extreme northern part of the breeding range, as in Saskatchewan, are not known to move northward in the manner of their more southern nesting relatives.

From a consideration of these data, especially those applicable to the Herring Gull, it would seem that for these species, migration may be inherited by the individual as a recessive character, which it largely outgrows as it reaches maturity.

The effect of the sex of an individual upon its migration has perhaps been better recognized, particularly in those species that exhibit conspicuous

sexual differences of plumage or song. The early spring arrival of male Red-winged Blackbirds, Orioles, House Wrens, and others is now associated with the selection of nesting territory. Weigold in his studies of the data from Heligoland found that the order of spring arrival for twelve species was: first, males only; second, mixed flocks; and third, females only; for fourteen species: first, males only; and second, mixed flocks. Although he does not definitely say so, it seems probable that the males of those species migrating in company with the females were yearling birds returning for the first time to their breeding grounds. As has been previously pointed out by the writer (Bird Banding, 4: 149–155, October 1934) the weight of evidence from banding data indicates that the 'homing instinct,' or the return of a bird to the site or vicinity of its nest of the previous year, does not seem to operate until after the bird has first nested, and that the location of the first nest is largely a matter of chance in obtaining possession of unoccupied territory anywhere within the natural range of the species or subspecies, as the case may be. Accordingly, young males, not having the added incentive to return and claim their proprietorship of territory previously occupied, would tend to perform a more leisurely migration and so be inclined to travel with the later-arriving females.

It is, of course, not at all improbable that, having spent the period intervening between nesting seasons in more or less close association with other individuals from the same area in which it was reared, a yearling bird might come back to or near the area in which it was hatched, and finding unoccupied territory, proceed to establish its own territorial claims. The extensive work done by Mrs. Margaret M. Nice with the Song Sparrow demonstrates that this is not an infrequent happening (Trans. Linn. Soc. New York, 4: April 1937).

Although with most species of migratory birds the sexes probably winter together, there may be occasional segregation that will be discovered through banding data. Schuster in a study of the Hen Harrier found that the birds that failed to go south for the winter were chiefly females, the percentage running from 75 to 80. Comparable data for the American prototype, the Marsh Hawk, do not thus far support this statement, but admittedly the available material is incomplete because most Marsh Hawks and other birds of prey have been banded as nestlings when the sex could not be determined.

In considering the effect of sex upon individual migration, cognizance must be taken of those birds whose period of courtship is during the winter months. For most species it is hardly credible that the mated pair traveled southward together, and as the winter range is usually but a fraction of the breeding range, it is possible that the male and the female may represent distributional extremes. Under such circumstances, in the ensuing spring migration one bird influences the other to the extent of altering both its

migration route and its breeding area. Such a situation may go so far as the irregularity Dr. A. Landsborough Thomson has called "abmigration," wherein a resident bird mates with a winter visitor to that area and in the ensuing spring migrates northward to a region it has never before seen. It is probable that this occurs occasionally among many kinds of birds, but it is most frequent among migratory waterfowl. The evidence now available indicates that among ducks the influence of the female is the determining factor in the route of the migratory flight.

The investigation of individual migration must also be considered from the viewpoint of heredity. There seems reason to believe that although the migratory impulse is basally inherited by each individual and that the act of migration is brought about through the operation of a complex series of stimuli, there is, nevertheless, much individual variation in the effectiveness of the physiological and seasonal rhythms that actually initiate the movement. Certain individuals for one reason or another fail to respond to the changing seasons. This does not appear to be correlated with either age or sex, and in its most common manifestation is responsible for the summer or winter residences of birds far outside the normal range of the species at that season. Different species of shorebirds offer notable examples.

It has been generally postulated that not only is the instinct to migrate hereditary, but that there is also an hereditary instinct or knowledge of the route to follow and the means for keeping on it. Possibly in the light of our present knowledge that is the best we can do, but studies of the recovery records of banded birds from a single brood that have been retaken at widely separated points suggest the operation of other factors. An outstanding example of this nature is that of a brood of European Widgeons banded in Iceland, the individuals of which were subsequently recaptured in both Europe and the United States. This problem offers a fascinating field for investigation, as it may be approached only by comparison of the routes of travel of banded birds that are members of the same broods.

Among the extensive files of banding data there are now sufficient records to indicate that an individual bird *usually* behaves the same way in successive seasons. The word "usually" must be emphasized, as there are cases sufficient to prove that no hard and fast law can be established to account for the migratory movements of any one individual bird. Outstanding among such material are the life-history studies made on the Song Sparrow by Mrs. Nice. In her investigations of this species she found that "the difference between migrating and non-migrating" birds in that locality (Columbus, Ohio), had "nothing to do with age and also is not a matter of inheritance." In summing up her data she found that seven resident fathers had seven resident sons, and that four migratory fathers had four migratory sons. On the other hand, two resident fathers had two migratory

sons, and five migratory fathers had seven resident sons. Among 61 males, 24 remained consistently resident, 31 always migrated, and the other six changed their status from resident to migrant or vice versa. Of the females, only five were consistent residents, 37 always migrated, and one changed her status from resident to migrant.

Although it may seem trite to discuss further the comprehensive analysis already made of these data, the following possible hypothesis occurs to the writer. Generally speaking, the Song Sparrow is not a species with a well-developed migration, and the instinct might accordingly be considered recessive, for there is a vestigial remnant of what earlier may have been a more uniform migratory movement. With this assumed delicate balance between resident and migrant, it might well be that a slight change in the climate, in the nature of the food supply, or even in the physiological condition of the individual bird at the time migration would normally take place would be the deciding factor in any particular season. In the absence of definite proof one way or the other, such suggestions have their chief value in pointing to the need for further study. We now have a method for the study of individuals in migration and it remains to be seen how well we shall use it.

U. S. Biological Survey
Washington, D. C.

3.—THE SOCIAL KUMPAN AND THE SONG SPARROW

BY MARGARET MORSE NICE

KONRAD Lorenz's brilliant exposition of "The Kumpan in the Bird's World. The Fellow-Member of the Species as Releasing Factor of Social Behavior" (1935) offers us a foundation for the study of bird behavior. "The peculiar rôle that the fellow-member of the species plays in the life of the bird,"[1] he writes (1935: 145), "has been strikingly designated by Jakob von Uexküll as the Kumpan (companion)." We perceive objects as *things*, for we combine the different stimuli from the same object, but animals react to *one* stimulus from an object. Instinctive behavior, directed toward an object, is released through a very small choice of the stimuli coming from that object. When several functions have the same thing for an object, each function corresponds to a different stimulus coming from the same object. The unity of these several functions lies in the object, not in the subject.

Characters that bring definite instinctive responses in a member of the species, Lorenz calls releasers, while Tinbergen (1939) suggests "signals." These may be bodily organs, or striking behavior, or a combination of both; they are compromises between simplicity and improbability. Five Kumpans are listed by Lorenz: Parent, Child, Sex, Social, and Brother-and-Sister.

I will discuss the Social Kumpan as I have found it in the Song Sparrow (*Melospiza melodia*) from eight years' intensive study on wild birds, individually distinguished by colored bands, in Ohio (Nice, 1937), and six months' experience with a brood of hand-raised birds, hatched in Massachusetts, July 24 (B and R) and 25 (Y) and taken from the nest July 30. All three proved to be males. On October 14, R was killed, apparently by flying against a window. I have had them almost constantly with me, all having the freedom of my study until November 14, when it became necessary to separate the two, putting Y in a cage 2 x 3 x 4 feet in size, and leaving B free.

In the introduction to the section on the Social Kumpan, Lorenz (1935: 347) tells us that with many birds "we find truly organized societies, whose super-individual function comes about through definite social instinctive actions and chains of instinctive actions of their members." Unlike human societies, these associations are not based on tradition, nor on insight into the benefits of cooperation. "By closer analysis of the instinctive actions that effect the cooperation of the members of such a highly organized bird society, it becomes apparent that seemingly very complicated behavior of

[1] My translation of the 1935 article, as throughout this paper.

the society is brought about through remarkably few and simple reactions of the individuals." The problem is to discover the reactions that underlie this highly socialized behavior. Lorenz (1931) has done this for a markedly social bird, the Jackdaw (*Coleus monedula*). I propose to examine the functions of the Social Kumpan in a bird that is primarily an individualist.

Some general statements in regard to the Social Kumpan are given by Lorenz (1935: 348). A striking difference between insect societies and those of birds is that, "just as with the higher mammals and man, the majority of social reactions with birds are bound up with personal acquaintanceship of the individuals." That Song Sparrows on their nesting grounds are personally acquainted with their neighbors within a radius of a hundred meters I discovered by observation and by experiment when using birds in traps as decoys.

"The innate perceptual[1] pattern of the comrade is practically always *wide*," and the reactions of any social bird, raised by hand, can be transferred to man. "In the world of the solitary bird there is no place for a 'friend,' and for the Nightingale or Redbreast the caretaker is at best a useful food automat; but for the hand-raised Bullfinch or Siskin he is a Fellow-Bullfinch or Fellow-Siskin" (1935: 348). The pattern of Social Kumpan in a slightly social bird like the Song Sparrow does not seem to be wide; although I was the Parent-Kumpan of my three birds, I am not their Social Kumpan. The pattern of Social Kumpan for the Song Sparrow is probably that of a bird approximately their size and with the specific notes.

Six releasing functions of the Social Kumpan are listed by Lorenz (1937: 272): "inducing of reaction by 'contagion' and so-called imitation"; "releasing of following reactions"; "of responses to warning"; "responses to the disappearance of the social companion"; "interlocking of instinctive actions pertaining to the pecking-order and to nest-protection"; "social attack reactions." The functioning of the Social Kumpan in the Song Sparrow will be considered under these categories.

(1) *Inducing of reaction by "contagion" and so-called imitation.*—In the reciprocal behavior of parents and young, and of mates, the instinctive action of one bird usually releases a different reaction in the other. With the members of a society, however, the instinctive action of an individual is characteristically released by the same action. It is not a matter of imitation, but of suggestion, as in yawning in human beings.

With my hand-raised Song Sparrows there was a definite social bond lasting through the fall. When one bathed or ate or preened, the others were apt to do likewise; when one flew to my desk, another was apt to follow him, while expeditions into the forbidden regions of the dining or living room were

[1] That "perceptual" is the correct form rather than "perceptory" was pointed out by Craig in 1938.

usually made, not singly, but two or three together. Later, whichever bird was caged, although apparently content most of the time, occasionally tried hard to get out on noticing his free brother eating weed seeds in a box below him, or tearing up newspaper, or when the latter had flown into the living room.

The usefulness of this tendency to go where another has gone is apparent in the matter of locating sources of food. The suggestibility that tends to make all do the same thing at the same time contributes to flock solidarity in birds with a definite flocking tendency, for all eat at the same time and are ready to fly at the same time. Other evidence of a positive reaction to members of the species was given in the spring in Ohio when I often noticed that a newly arrived male would attempt to locate his territory in an area already full of Song Sparrows instead of selecting some of the suitable places not yet occupied.

(2) *The release of following reactions.*—With the Song Sparrow, which has no strong flocking tendency, there are no special structures nor notes to induce following. There was some tendency with my birds in the fall to follow a flying brother—without hostile intent. The Junco (*Junco hyemalis*), a markedly social species during the non-breeding season, not only has white tail feathers, but a characteristic flight note.

In cold, snowy weather in central Ohio the Song Sparrows form into loose flocks, but no bird acts as leader. This lack of leadership has been noted in the Domestic Fowl (Fischel, 1927), the Coast Bush-tit, *Psaltriparus m. minimus* (Miller, 1921), and Long-tailed Tit, *Aegithalos c. caudatus* (Paechnitz, 1936).

An interesting example of 'leadership' of a flock is given by Lorenz (1935: 352). His pet Jackdaw 'Tschock' associated in flight with a flock of Hooded Crows (*Corvus cornix*). "In such cases when I called the Jackdaw and he flew hurriedly in my direction, the whole flock of Hooded Crows came after him, to turn aside in fright when almost upon me. This following the example of one that 'knows what he does' gives food for thought. Since these intelligent Corvidae meet with many experiences with increasing years, and gradually become more purposeful and decided in all their movements, I believe that with them the old experienced leader plays an important biological rôle."

(3) *Responses to warning.*—The Song Sparrows react instantly to evidences of fright in their companions; a sudden flight or the fear note given by one will send the others into hiding immediately. The bird does not intentionally 'warn' its companions nor even its young; it also 'warns' when alone; this behavior and these notes are understood by them instinctively.

The earliest age at which this reaction was seen with my birds was with Y at the age of six days. Because of the hot weather I had put B in a nest

by himself, and when at 7.30 p. m. I picked the bird up to return him to his brothers he crouched and shrieked; immediately the others crouched—the first time I had seen this action in Y. The fear note *tik tik tik* was first noted at twenty and twenty-one days.

(4) *Responses to the disappearance of the social companion.*—The Song Sparrow's call note *tsip* is heard most often in the autumn, since the social bond is evidently strong at the time of the fall migration. In the spring and summer one of a pair gives it when it has lost track of the whereabouts of its mate. This 'lonely' note, of course, is a device for keeping in touch with others of its kind—*Stimmfühling* as Heinroth (1924) calls it.

With my hand-raised birds the *tsip* appeared to develop from *yeep*—the location note of the young bird that has left the nest. At twenty days it was clearly *tsip*. Y had made an expedition out of my room and finding himself alone and in strange surroundings called *tsip* many times, but neither brother answered. In the fall, when one went into the next room, he usually called *tsip*, the others sometimes responding to him; perhaps the bird was reassuring himself in the new situation by keeping in contact with his brothers. In January the room had become familiar, and it was the bird that was left behind—confined in the cage—that was more apt to call than was his brother.

Lorenz (1931) describes the uneasiness in a Jackdaw community after the disappearance of comrades and the searching that takes place; he says he knows of this only in this highly socialized species.

On October 14, R was killed; the two others, although in company of each other, called *tsip* for about an hour appreciably more than they ever had before. The disappearance of this lively bird—the middle one in the peck order—made a striking difference in the action and noise in my study.

Experiments were tried the last of December, of first removing B from the study and then returning him and banishing Y. The brother that was left called *tsip* a few times, but the birds, subjected to extra light in the evenings and to spring temperatures, were ready to proclaim territory, preferring each other's "room to his company."

On February 2, B killed himself by flying into something at night. The following morning Y did not call *tsip*, but was restless and gave the *chunk* note that sometimes expresses uneasiness.

(5) *The interlocking of instinctive actions pertaining to the pecking order and to nest protection.*—With wild Song Sparrows there is a certain amount of despotism. In the fall they frequently chase each other, while in the loose winter flocks there is some driving, particularly at feeding shelves. In such situations in Columbus, Ohio, Song Sparrows usually drove English Sparrows (*Passer domesticus*) and Juncos, and sometimes threatened Cardinals (*Richmondena cardinalis*).

In Nature, young Song Sparrows normally leave the nest at ten days; they spend a week separated from one another, hidden in the bushes, after which they appear, well able to fly, and come in contact again with their nest mates. With my three birds it was at seventeen days that the first fight took place and a note of antagonism was first heard. From then on there were occasional bickerings, particularly between R and B. Until the birds were nearly two months old the situation remained one of 'give and take' or 'peck dominance' as found by Masure and Allee (1934a, 1934b) in pigeons and Shell Parakeets (*Melopsittacus undulatus*) and by Shoemaker (Allee, 1936) in canaries, rather than of 'peck right' as in chickens (Schjelderup-Ebbe, 1935; Masure and Allee, 1934a). Chasing was more or less indiscriminate, although on the whole R was top bird, Y middle bird and B at the bottom.

On September 21, B suddenly became despot over Y and on the 24th over R. B used the note of antagonism as a threat whenever R approached him as he (B) was eating. Y had difficulty in getting baths as both brothers drove him away as soon as they noticed him in this occupation. Many fights were staged between R and Y; on such occasions B often hurried to the scene, giving the *chunk* note of disapproval or the threat note. It gave me the impression of a rudimentary policing technique, on something the same order, although far less definite, as that of the communal nest-protection reaction of the Jackdaw community (Lorenz, 1931). Much the same thing is often seen in barnyards where the dominant rooster breaks up fights between his subordinates. Schjelderup-Ebbe (1935) speaks of this as follows: "The sight of two combatants in their fighting attitudes has a strong exciting and stirring effect upon the bird which is despot over both. . . . it cannot bear to see its subordinates in their fighting attitudes, taking this as a kind of challenge to itself."

Dr. N. Tinbergen writes me, "With Eskimo sledge dogs, the leader of a team often intervenes in a struggle between two subordinate dogs of the same team."

After R's death on October 14, the study was a far more peaceful place. B was the benevolent despot over Y, warning him with the threat note when he came too near at meal times. On the morning of November 7 it was evident that a revolution had taken place, and Y proved to be a real despot.

Up to this time both birds had been put into their small cage to sleep at night, but on the 7th Y was caged and B left free. The next morning B was benevolent despot once more. He was caged that night and in the morning I found Y on top of the cloth-covered cage singing his loudest; I released B, and Y persecuted him. Y was confined the rest of the day and all night; on the 10th, B's mild rule was reinstated, but by evening Y became dominant

and remained so for two days despite the fact that he was again banished to the little cage. (The criterion for dominance when one bird was caged was the threat note.) I then installed a large cage—2 x 3 x 4 feet—in the study and kept Y inside till November 29, when he was let out and B confined till December 23; all this time B was despot. Both birds were free from the 23d to 28th, B being dominant, but not tyrannical.

This peaceful situation was ended by my taking B away for a night and the early morning. Territorial behavior came into play—hastened by disturbed evenings and warm temperature; Y adopted the study as his territory and drove B savagely upon his return. Y was then removed for two days, at the end of which time B had taken over the study. Nevertheless Y was able to gain the mastery the next day, losing it three days later, but regaining it once more in less than two days. Throughout January there were seven reversals of dominance, B having the mastery about one third of the time. Reversal of dominance has not been effected through fighting. It is difficult to analyze the conditioning factors; all we can say is that one bird gains self-confidence and is able to intimidate the other through loud singing.

Dr. Tinbergen wrote me that sudden changes in the despotism relationship occurred with his Song Thrushes (*Turdus ericitorum*) "when, in midwinter or even during fall, one of the subordinate birds suddenly began to sing." With my birds, B was the most precocious singer in early October, but by the first of November Y had caught up with him. On November 8, the day after the first revolution, I noted, "Y is maturing faster than B; witness the short songs." On November 11, "Y's songs are loud, harsh, whistled. B never sings in this way." November 14, "Y is singing splendidly." November 16, "B is silent; he almost never warbles."

By November 23 when B had become despot, both were singing loud, short songs. From November 28 to December 8 there was no singing at all; after that B—the despot—was the first to take up adult singing once more, on December 19 giving loud, separate songs. On the 28th when B had been removed, Y for the first time since November sang in this territorial manner.

To sum up, the situation from seventeen days to two months was that of peck dominance; after that it was peck right, either one bird or the other being definitely master. It must be remembered that these Song Sparrows are living under distinctly abnormal conditions.

The fact that Y is a much more tyrannical despot than B appears to be a rule of wide application in the animal kingdom. My sister and I as girls noticed that the lowest hen in the peck order would persecute a newcomer far more than did the others. Tompkins (1933) reports the same with captive Spotted Towhees (*Pipilo maculatus falcifer*), and Schjelderup-Ebbe says in regard to chickens: "A bird which has originally been pecked by all

the others becomes strikingly cruel and merciless when it finds opportunity to peck at others; the unpractised despots are the worst of despots."

Despotism in the nesting season is kept in bounds, as with herons as described by Lorenz (1935: 362), by the factor of territory. The weakest male is master on his own territory. It is with territory that the Song Sparrow's social organization as I studied it in Ohio is most marked. Through chains of instinctive actions a large population of this aggressive species is able to live in proximity without serious interference with one another's affairs. I believe that Song Sparrows prefer to live side by side with members of their own species, for in this way many of their instinctive reactions can function which are never called into play in the case of a solitary pair. That some Song Sparrows appeared to seek territorial quarrels was shown when individuals deliberately trespassed on each other's land.

(6) *Of social attack reactions.*—The alarm note (*chunk*) given by nesting Song Sparrows on the approach of an enemy—cat, Cowbird (*Molothrus ater*), or man—is often taken up by neighboring Song Sparrows and also by other species of small passerines. Although such behavior often gives away the secret to man, it is useful to the birds in two ways: it warns the young to keep quiet, and it makes it impossible for the predator to creep unheralded upon its prey. A loud scream, given by an adult when carried 400 meters in a darkened gathering cage with a Cowbird, brought out all the nesting Song Sparrows along the way, their crests up and giving the alarm note.

SUMMARY

The Song Sparrow is ordinarily considered rather anti-social, being a typical territory-holder during the long breeding season, although forming into loose flocks in cold, snowy weather, and probably migrating with others of its kind in the fall. A close study reveals, however, a surprising number of social reactions, many of which function throughout the year. Some of these are of undoubted survival value: the so-called imitative tendency that assists in location of food supplies, the reaction to evidences of fright in companions, the social defense against enemies, and territorial behavior that affords protection of individual rights.

REFERENCES

ALLEE, W. C.
1936. Analytical studies of group behavior in birds. Wilson Bull., 48: 145–151.
CRAIG, W.
1908. The voices of pigeons regarded as a means of social control. Amer. Journ. Sociology, 14: 86–100.
1938. Psychological terms. Auk, 55: 159.

FISCHEL, W.
1927. Beiträge zur Soziologie des Haushuhns. Biol. Zentralbl., 47: 678–696.
HEINROTH, O.
1924. Lautäusserungen der Vögel. Journ. f. Ornith., 72: 223–244.
LORENZ, K.
1931. Beiträge zur Ethologie sozialer Corviden. Journ. f. Ornith., 79: 67–127.
1935. Der Kumpan in der Umwelt des Vogels. Journ. f. Ornith., 83: 137–213; 289–413.
1937. The Companion in the bird's world. Auk, 54: 245–273.
MASURE, R. H., AND W. C. ALLEE
1934a. The social order in flocks of the common chicken and pigeon. Auk, 51: 306–325.
1934b. Flock organizations of the Shell Parakeet, *Melopsittacus undulatus* Shaw. Ecology, 15: 388–398.
MILLER, R. C.
1921. Flock behavior of the Coast Bush-tit. Condor, 23: 121–127.
NICE, M. M.
1937. Studies in the life history of the Song Sparrow. I. Trans. Linnaean Soc. New York, 247 pp.
PAECHNITZ, H.
1936. Aus dem Tageslauf überwinternder Schwanzmeisen (*Aegithalos c. caudatus*) Vogelzug, 7: 175–179.
SCHJELDERUP-EBBE, T.
1935. Social behavior of birds. Murchison's Handbook of social psychology, pp. 947–973.
TINBERGEN, N.
1939. On the analysis of social organization among vertebrates, with special reference to birds. American Midland Naturalist, 21: 210–234.
TOMPKINS, G.
1933. Individuality and territoriality as displayed by three passerine species. Condor, 35: 98–106.

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4.—THE RÔLE OF DOMINANCE IN THE SOCIAL LIFE OF BIRDS

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BIRD flocks are held together by mutual attractions which are often innate. Witness the flocks of Cowbirds (*Molothrus ater*) which gather from broods reared by a wide variety of foster parents. On the other hand, training may seriously modify these reactions. In extreme cases, such as the Graylag Goose (*Anser anser*) described by Heinroth and Heinroth (1928), mere exposure of the young to a foster parent for a short period at the time of hatching will bind these young to this foster parent for a long period (Lorenz, 1935). Again, there are forces tending to disrupt the flock and these of course vary with the age of the bird and with the conditions of the environment. It is a curious fact that one regulating mechanism of bird society, the dominance drive, has been credited with both centrifugal and centripetal powers. In recent years this drive has been studied experimentally in many groups of vertebrates and certain general conclusions have been reached which give us a better understanding of bird behavior.

It is now well known from the studies of Schjelderup-Ebbe (1924), Masure and Allee (1934), Murchison (1935, 1936) and Skard (1937) that no two hens, or roosters, can remain very long together in the barnyard without establishing which is superior or inferior to the other. In a flock, a dominant hen may peck a subordinate without fear of retaliation. The latter may be dominant over a third, and the third over a fourth. The 'pecking order' which results is not closely correlated with the relative weights of the birds. Schjelderup-Ebbe (1935) believes that the circumstances of the first meeting of the two hens and their relative courage are as important as strength in determining which will become dominant. A position in the pecking order is not, however, always determined at the first meeting but may be deferred for days. Masure and Allee (1934) found that the ranking birds tend to make more contacts than do those lower in the social scale. This suggests that an inherent aggressive disposition may favor a bird's securing a position high in the order.

Among Domestic Fowls the males early become dominant over the females. Schjelderup-Ebbe (1924) noted that the vigor of the attack of the rooster on the hen abates with the rise of sex interest but he insists that "only in those cases where the male absolutely dominates the female does she submit to copulation unresistingly." He further generalizes that in all animals, female dominancy has a detrimental effect on procreation. Murchison (1935) found that if a hen is released between two roosters she tends to move toward the more dominant of the two males. It would seem that roosters high in the order would have greater opportunities of mating. When, how-

ever, roosters were released with hens in a large yard each cock was found to have his 'favorites' which were not always high in the pecking order (Skard, 1937).

Dominance behavior has been reported in many groups of birds but the social hierarchies, where adequately studied, have been found less fixed than those of the Domestic Fowl (Allee, 1938). Tompkins (1933), working with three species of California birds in winter, found that the most solitary species, a towhee, *Pipilo maculatus falcifer*, had the most rigid social hierarchy. The dominance drive in some form or other appears widespread throughout the vertebrate series. In fishes, as for example in the common swordtail, *Xiphophorus helleri*, a 'straight line' system, as rigid as that of the fowl, occurs (Noble and Borne, 1938). In this species it is possible clearly to distinguish the sex from the dominance drive merely by cooling the water, for the sex drive disappears first. Similarly among infra-human primates, Maslow (1935, 1936) has been able to distinguish the two drives. These had been confused previously in primates chiefly because sexual behavior patterns form part of the dominance display.

The difference between social and sexual dominance may be readily observed in birds. If we release immature and adult Black-crowned Night Herons (*Nycticorax nycticorax hoactli*) together in a large cage, the latter will select the most suitable perches and drive the immatures out of these areas. This aversion for one another is a manifestation of the dominance drive but a peck order, similar to that of the domestic fowl, does not appear unless the birds are crowded together in a strange area. If the young herons driven from their perches have their sex drive hypertrophied by treatment with male hormone they are able to drive away the adults even if they are only thirty days old (Noble and Wurm, 1938). The latter aggressive behavior differs from the former not only in the vigor of the attack but in the incentives involved. The treated young are excited by sticks which they play with in a formalized manner. The sex drive makes the birds come near suitable nesting areas while the dominance drive determines merely a wide spacing of them in the cage.

The dominance drive in all vertebrates is continuous, not cyclic like the sex drive. Further, the latter drive has a well-known hormonal basis unlike the former. Schjelderup-Ebbe (1924, 1935) employed the word dominance to cover a wide variety of phenomena such as the driving of a crow by a kingbird, or the seizing of a sparrow by a bird of prey. Where the motivation is entirely different, as for example in the case of a hawk stimulated by hunger contractions of its stomach to seize prey, as contrasted with a heron aroused by sexual hormones to drive others from a nest area, it seems highly desirable to distinguish the phenomena with adequate terminology.

It has long been recognized that most male passerine birds when sexually

motivated seek first territories and not female partners. Since these territories may be large their value as a potential source of food for the young has been frequently stressed. Recent observations have tended to minimize the food value of territories (Lack, 1937). After five years' study of the Great Crested Grebe (*Podiceps cristatus*) Venables and Lack (1936) believe that territory "results from an aggressive disposition possessed by some individual Grebes only, and which is of no fundamental significance to species."

The word 'territory,' like that of dominance, has been employed to cover a variety of phenomena. Brooding and winter territories, recognized by ornithologists (Meise, 1936), may frequently be distinguished from sexual territories on a motivational basis. Recently Tinbergen (1936) has suggested that the term 'territory' be restricted to "an area which is defended by a fighting bird shortly before and during the formation of a sexual bond." Unfortunately this definition would rule out the area immediately surrounding a courting Ruff or Black Cock for the female merely comes to the *lek* for copulation purposes and no bond in the strict sense of the word, that is a pairing off, is formed. Nevertheless, these small mating areas have primarily the same function as the heron's territory; they make possible the male's recognition of a sexually-ready female. The Black-crowned Night Heron does not copulate the moment a female enters a male's territory. After her sex is identified, courtship takes place and it is during this period that bonds are formed which will hold the pair together during the breeding season.

Territory, like dominance, is by no means restricted to birds. Sexual territory is a direct consequence of the nest-building habit in vertebrates. Where both parents in either fish or birds are to share equally in the duties of rearing the eggs and young, the future parents engage in courtship activity which borrows and frequently formalizes some of the behavior patterns of nest construction or young-rearing. The modalities of a later stage of life history are merely projected forward and abbreviated until they are often merely 'symbolic' of the normal pattern. The biological value of this transposition seems clear. The future parents must associate together, react in common if bonds are to be formed which will hold them as a pair during the entire breeding season. There is no sudden 'imprinting' (Lorenz, 1935) of a sexual partner at this later stage of development but only gradual conditioning. The human keeper of birds who handles his charges too frequently may find a bird has attached itself to him in a bond of sexual affection. If pairs of birds or fishes are to form a bond between themselves they must develop behavior different from the feeding or locomotion of non-breeding members of the group. It is therefore not surprising that the rule for both fishes and birds is to project forward in the cycle modalities of

behavior which normally unfold later in a fuller form. Birds have gone beyond fishes in the greater variety of their courtship and also in borrowing behavior patterns, such as sexual preening, which are restricted to no phase of the life history. Further, females of many different species differ from fish in adopting the begging attitude of the young when inviting coition by means of distinctive cries.

It has not been adequately emphasized that every territory, largely as a result of this forward projection of nesting behavior, is itself more or less sexually stimulating. A young male dove breeding for the first time tilts forward while sounding the nest call. He shifts his position until he finds a corner which more or less fits his body while in the tilted attitude (Craig, 1918). Similarly a young night heron breeding for the first time not only plays with sticks in an excited manner but attempts to place them in such a position that they will form a rough platform. Female night herons are also excited by sticks but never to the extent of playing with them in a formalized manner. Nevertheless by treating a female with male hormone (testosterone propionate[1]) it is possible gradually to increase this interest until the full male pattern develops. It then becomes clear that the difference between the masculine and feminine point of view on territory is not due to brain differences but merely to the amount of male hormone in their bodies (Noble and Wurm, 1938).

Species vary in the components of their courtship; similarly they differ in the relative importance territory plays in their pairing off. For example, Lehrman and I saw groups of Laughing Gulls (*Larus atricilla*) early in the season this year (1938) standing on drift weed at a distance from their later nesting territories. The females were begging indiscriminately among the males. By adopting the juvenile behavior they were trying to force males to regurgitate. Sexual readiness of the female of this species is indicated by begging and not by her entering an area which has become sexually stimulating to the male. After this initial pairing off the birds stand together in pairs and weld the marriage bond with mutual head-bobbing. It is only later that they secure a territory and this is a nesting, not a sex territory.

In a few vertebrates the female may become sexually interested in a territory before the male. The female salmon begins to dig her nest before the male arrives (Noble, 1938), female Oropendolas (*Zarhynchus wagleri*) start nest construction before the male becomes attracted to the activity (Chapman, 1928). Females of the European Cuckoo (*Cuculus canorus*) have their own territories and own sex call, a bubbling note, very different from the male's call which we hear from the familiar cuckoo-clock. There may be vigorous battles among females (Skinner, 1922) but not among

[1] We are indebted to Dr. MacBrayer, of the Ciba Pharmaceutical Products, for this material. This investigation was supported by the Josiah Macy, Jr., Foundation.

males when they are attracted by the cry of the female (Nõtel, 1921). The latter is peculiar in that she is stimulated not by the nesting behavior of her male but by that of her victims. This condition is apparently the result of early training for the females tend to victimize the particular species in whose nest they were reared. Just as pigeons, reared by parents of other species, prefer to associate with these species instead of with their own kind (Whitman, 1919), so the cuckoos reared by foster parents are attracted by nesting behavior of these birds later in life.

Mammals frequently breed within well-circumscribed home ranges which have been called territories (Burt, 1937; Darling, 1937) but these home ranges of non-egg-laying vertebrates differ from sexual territories of birds and fishes in that the terrain itself is not sexually stimulating to the mammal (unless contaminated by secretions of the opposite sex). They are merely occupied areas in which the owners resent trespassers in or out of the breeding season. Many non-breeding fish or birds resent intruders into their domains in exactly the same way. This aversion to newcomers is widespread in the vertebrate world and being an aversion it may increase the strength of a dominance drive. A non-breeding pigeon low in the pecking order, if allowed to remain in a small area, becomes dominant over a superior pigeon which is introduced into this area for the first time (Noble, Wurm, and Schmidt, 1938). Obviously a territory so useful to a subordinate bird has nothing to do with a sexual territory. It is merely a retreat, which, because of its strangeness to newcomers is avoided by them. In brief, while a territory is any defended area, sexual and nesting territories are characterized by sexual or nesting activity, in contrast to a retreat which is occupied because it is familiar and defended because any newcomer is irritating to the resident.

In a few birds, such as Gould's Manakin (*Manacus vitellinus*), the female may build her nest beyond the territory which is sexually stimulating to the male (Chapman, 1935). This nest area is undoubtedly stimulating to the female for it tends to satisfy her parental drive. A nesting territory may be, therefore, distinguished from a sexual territory or a mere retreat on a motivational basis. In most birds the distinction between a sexual and a nesting territory is less clear because the nest construction takes place in the male's sexual territory. In species such as the Robin (*Turdus migratorius*) where the female alone usually builds the nest in the male's sexual territory, the latter is stimulating to the male only in that it offers a place suitable for his song or display. Selous (1933) considered the nest of the Mute Swan (*Cygnus olor*) a "sexual maelstrom," and the same may be said of the nest of the night heron and that of other birds with courtship behavior involving nesting material. In species in which the female alone builds, special behavior patterns, such as 'sexual flight' (Howard, 1929) may be utilized

as a substitute for mutual courtship in assuring the formation of nuptial bonds. Sexual flight resembles mutual courtship of fishes and birds in that the pairs engage in a mutual ceremony which is highly stimulating to both partners. Mutual courtship is widespread in such primitive birds as swans, grebes and herons. It may be considered the primitive pattern from which other types of avian courtship have been derived.

Courtship movements of fish and birds usually include: (a) threat movements which serve to drive other males from the territory and to test the sexual readiness of the females; also, (b) 'symbolic' or mutual movements which aid in the formation of bonds. The female bird, when threatened by a territory-holding male, postures and this releases further sexual behavior in the male (Craig, 1909). This threat may take a wide variety of forms but when it resembles the normal threat of a socially dominant bird it tends to confuse the distinctness of the two drives. Allee and Collias (1938) have shown that hens injected with male hormone may rise in the pecking order. This is to be expected, however, since males dominate females and the treatment had merely partially reversed the sex of the hens. A more extended treatment would very probably have produced a complete sex reversal such as Noble and Wurm (1938) described in the night heron.

In birds such as the night herons, which do not threaten the sex partner during courtship, the male frequently endeavors to secure a more erect position of head before copulating. In this sense the male may be said to be dominant over the female. Nevertheless, in the night heron there is no dominating challenge of the male which releases sexual behavior in the female. Still, male night herons which fail to secure the dominant position of the head fail to copulate. Crested Grebes and Moorhens (*Gallinula chloropus*) which fail to show a difference in head posture, practice 'reversed coition' (Huxley, 1938). The absence of reversed coition in the night heron is not due to head-posture alone. At the beginning of courtship the male holds the head lower than that of the female and yet no reversed coition occurs. Dominant head-posture in the night heron is merely a position necessary for coition. Incidentally, it makes the male bird dominant over the female with the result that she gestures first when they practice mutual courtship ceremonies. If a male will adopt a similar subordinate position, he may remain in another male's territory and if they practice mutual ceremonies, a bond may form between them.

In many birds the dominance threat to the sex partner is done vocally. In these cases, as for example in many passerine birds, the males usually have little sexual adornment. Compare two such polygamous species as the Corn Bunting (*Emberiza calandra*) and the Ring-necked Pheasant (*Phasianus colchicus torquatus*). Voice of the former takes the place of the impressive livery of the latter. The Song Sparrow (*Melospiza melodia beata*) "pounces"

on the female after she has revealed her sex by special notes. Nice (1933) considers this analogous to the sexual flight of the Yellow Bunting (*Emberiza citrinella*) and, since copulation comes later, it may be a method of securing a bond of attachment between two birds of a pair. Further, many birds, such as the Starling (*Sturnus vulgaris*) described by Kluijver (1933), apparently induce posturing in the female by song alone, although here again the importance of the posture of the male has not been determined. Impressive behavior, whether postural or vocal, differs from a true attack which would only serve to call forth defensive behavior in the female. Impressive behavior alone does not result in the formation of a nuptial bond. Other behavior patterns are necessary for this, among both birds and fishes.

In correlation with the different courtship patterns of birds, mounted specimens placed in the sexual territories of different species produce different results. A mounted female night heron calls forth no response from either sex. In the same way mounted Flickers (*Colaptes auratus luteus*) are ineffective in producing copulatory behavior, for the male waits for a sexual cry or motion from the female to release his response. A mounted female pheasant or wren will induce this behavior in the male even when the female is a differently marked species. The quiet figure of the mounted bird deceives the male. The latter reacts as if the mounted bird had postured to his vocal or feather display.

In birds with marked sexual dimorphism, such as the rooster, merely caponizing has sometimes been found to call forth sexual behavior in other males (Pézard, 1926). To what extent posturing of the capon or merely lack of male carriage is responsible for these cases is not clear. The rooster differs from the hen in the greater amount of male hormone in his tissues as indicated externally by the larger comb. Apparently the different carriage in the two sexes is a function of the amount of the male hormone present. This may be true also of sexually homomorphic birds such as the night heron. It does not follow from this that within one sex the relative position of a bird in its social hierarchy is correlated with the amount of male hormone present in its tissues, because these hierarchies may form long before sexual maturity.

Sexual dominance may or may not make use of the same threat employed in social dominance but there is a wide difference between them. Social dominance is directed toward objects with an uncanny eye for detail. The social position of the newcomer is learned by experience and a bird second or third in a pecking order is distinguished at once even though we can see no difference between them. In striking contrast, the more emotional behavior, namely, that activated by the sex drive, tends to ignore detail although sex differences in color may be recognized. The evidence at present at hand indicates that this recognition is also a matter of training. Young

Red-winged Blackbirds (*Agelaius phoeniceus*) at first mating will copulate with mounted birds of either sex, but older individuals captured in the field copulate only with female mounts (Noble and Vogt, 1935). A badly mounted or posed bird is usually avoided socially but it will often produce a sexual reaction provided that the courtship is one in which a threat releases posturing in the live sexually ready female.

Sexual dominance has precedence over social dominance apparently in most vertebrates, although Lorenz (1931) did not seem to find it so in the case of his Jackdaws (*Coleus monedula*). In night herons on breeding territory, social dominance becomes reduced as evidenced by the frequent approximation of nests. In canaries, even subordinate birds are dominant in their own territories (Allee, 1938). In Jackdaws (Lorenz, 1931) and monkeys (Maslow, 1934–1936), pairing with a male high in the social order raises a female in her social order. Such females, out of their social position, so to speak, may become very mean to their former superiors. Where females have little sexual aversion for one another, as for example in the Corn Bunting described by Ryves and Ryves (1934), polygamy tends to arise. This type of diminution of aversion merely means that the female is less aggressive in the defense of her nest area and may or may not be correlated with a weak dominance drive outside of the breeding season when sexual attractions and aversions are not in operation. Nevertheless, there is some evidence that a socially subordinate male may not defend as large a sexual territory as a more dominant male. Chapman (1935) found this to be true of Gould's Manakin and the same would be expected in any group with crowded territories.

Reproduction of mammals is believed to differ from that of birds in that "it is more related to emotional states and more under the control of higher nervous centres, with the result that stimulative display is rare in the former, common in the latter" (Huxley, 1938). Birds differ from most mammals (except rabbit, ferret, etc.) in rarely ovulating without external stimulation. Craig (1913) has shown that caressing a virgin dove by hand and Bartelmez (1912) that merely keeping a pigeon in a cage adjacent to a courting male would induce ovulation. From such data as these Marshall (1936) concludes that the biological value of sexual display and adornment is "to bring about ovulation and the related processes at the most appropriate time." Courtship does aid synchronization of male and female sexual behavior even in fish (Noble and Kumpf, 1936). There are, however, other facts to consider. The elaborate courtship of nest-building fish differs from the simple display of most viviparous species, roughly, in the same degree that the courtship of birds differs from that of mammals. It is the nest-building habit of birds and the need for the formation of bonds in species which rely chiefly on visual and auditory cues that have been responsible

for the elaborate courtships of birds. Where the courtship is short but brilliant, the display may be a threat, essential to induce female posturing, but not producing a marriage bond. Where the courtship is long and with many 'symbolic' components, bonds are formed which will hold the pair together for the season.

In conclusion, therefore, it may be repeated that display, i.e., sexual dominance behavior, has exactly the same function in fish and bird. Social dominance is found not only in these groups but throughout the vertebrate series and is readily distinguished from sexual dominance. Territory should also be sharply divided into different categories. Sexual territory, which is so characteristic of most birds, is, however, found in most egg-laying and nest-building vertebrates. It arises from the sexual interest of the animal in an area suitable for nesting and it functions primarily to test sexual readiness of the opposite sex and to make possible the formation of sexual bonds. Sexual territory is not to be confused with a nesting territory which has a different motivational basis, nor with an isolated retreat which is defended by many vertebrates against intruders at any season.

REFERENCES

ALLEE, W. C.
1938. The social life of animals. New York.

ALLEE, W. C., AND COLLIAS, N.
1938. Influence of injected male hormone on the social hierarchy in small flocks of hens. Anat. Rec., 72 (4) suppl.: 60.

BARTELMEZ, G. W.
1912. The bilaterality of the pigeon's egg. A study in egg organization from the first growth period of the oocyte to the beginning of the cleavage. Part I. Journ. Morphol., 23: 269–328.

BURT, W. H.
1937. Territorial behavior and population densities in mammals. Bull. Ecol. Soc. of Amer., 18 (4): 53.

CHAPMAN, F. M.
1928. The nesting habits of Wagler's Oropendola (*Zarhynchus wagleri*) on Barro Colorado Island. Bull. Amer. Mus. Nat. Hist., 58: 123–166.
1935. The courtship of Gould's Manakin (*Manacus vitellinus vitellinus*) on Barro Colorado Island, Canal Zone. Bull. Amer. Mus. Nat. Hist., 68: 471–525.

CRAIG, W.
1909. The expressions of emotion in the pigeon. I. The Blond Ring-Dove (*Turtur risorius*). Journ. Comp. Neurol. and Psychol., 19: 29–82.
1913. The stimulation and the inhibition of ovulation in birds and mammals. Journ. Animal Behav., 3: 215–221.
1918. Appetites and aversions as constituents of instincts. Biol. Bull., 34: 91–107.

DARLING, F. F.
1937. A herd of red deer. A study in animal behavior. London.

HEINROTH, O., AND HEINROTH, M.
1928. Die Vögel Mitteleuropas, vol. 3. Berlin.

HOWARD, H. E.
1929. An introduction to the study of bird behaviour. London.

HUXLEY, J. S.
1938. The present standing of the theory of sexual selection. *In* Evolution. Essays presented to E. S. Goodrich. Edited by G. R. De Beer. Oxford.

KLUIJVER, H. N., JR.
1933. Bijdrage tot de biologie en de ecologie van den spreeuw (*Sturnus v. vulgaris*) gedurende zijn voorplantingstijd. Wageningen. Reviewed in: Beitr. z. Fortpfl.-biol. d. Vögel, 9: 226–227.

LACK, D.
1937. A review of bird census work and bird population problems. Ibis, (14) 1: 369–395.

LORENZ, K.
1931. Beiträge zur Ethologie sozialer Corviden. Journ. f. Ornith., 79: 67–127.
1935. Der Kumpan in der Umwelt des Vogels. Journ. f. Ornith., 83: 137–213; 289–413.

MARSHALL, F. H. A.
1936. The Croonian Lecture. Sexual periodicity and the causes which determine it. Phil. Trans. Roy. Soc. London, B, 226: 423–456.

MASLOW, A. H.
1934. Dominance and social behavior of monkeys. Psychol. Bull., 31: 688.
1935. Individual psychology and the social behavior of monkeys and apes. Int. Journ. Indiv. Psychol., 1 (4): 47–59.
1936. The rôle of dominance in the social and sexual behavior of infra-human primates: III. A theory of sexual behavior of infra-human primates. Journ. Genet. Psychol., 48: 310–338.

MASURE, R. H., AND ALLEE, W. C.
1934. The social order in flocks of the common chicken and the pigeon. Auk, 51: 306–327.

MEISE, W.
1936. Neue Ergebnisse der Revierforschung. Mitt. Ver. Sächs. Ornith., 5: 1–23.

MURCHISON, C.
1935. The experimental measurement of a social hierarchy in *Gallus domesticus:* II. The identification and inferential measurement of Social Reflex No. 1, and Social Reflex No. 2 by means of social discrimination. Journ. Social Psychol., 6: 3–30.
1935a. The experimental measurement of a social hierarchy in *Gallus domesticus:* III. The direct and inferential measurement of Social Reflex No. 3. Journ. Genet. Psychol., 46: 76–102.
1936. The time function in the experimental formation of social hierarchies of different sizes in *Gallus domesticus.* Journ. Social Psychol., 7: 3–18.

NICE, M. M.
1933. Relations between the sexes in Song Sparrows. Wilson Bull., 45: 51–59.

NOBLE, G. K.
1938. Sexual selection among fishes. Biol. Rev., 13: 133–158.

NOBLE, G. K., AND BORNE, R.
1938. The social hierarchy in *Xiphophorus* and other fishes. Bull. Ecol. Soc. of Amer., 19 (2): 14.

NOBLE, G. K., AND KUMPF, K. F.
1936. The sexual behavior and secondary sexual characters of gonadectomized fish. Anat. Rec., 67 (1), suppl. no. 1: 113.

NOBLE, G. K., AND VOGT, W.
1935. An experimental study of sex recognition in birds. Auk, 52: 278–286.

NOBLE, G. K., AND WURM, M.
1938. Effect of testosterone propionate on the Black-crowned Night Heron. Anat. Rec., 72 (4), suppl.: 60.

NOBLE, G. K., WURM, M., AND SCHMIDT, A.
1938. Social behavior of the Black-crowned Night Heron. Auk, 55: 7–40.

NÖTEL, E.
1921. Interessantes Kuckucksschauspiel. Ornith. Monatsschr., 46: 63–64.

PÉZARD, A.
1926. Le déterminisme endocrinien du comportement psycho-sexuel chez les gallinacés. L'Anné, 27: 42–56.

RYVES, LIEUT. COL., AND MRS. B. H.
1934. The breeding-habits of the Corn-bunting as observed in North Cornwall: with special reference to its polygamous habit. British Birds, 28: 2–26.
1934a. Supplementary notes on the breeding-habits of the Corn-bunting as observed in North Cornwall in 1934. British Birds, 28: 154–164.

SCHJELDERUP-EBBE, T.
1924. Zur Sozialpsychologie der Vögel. Zeitsch. f. Psychol., Leipzig, sect. 1, 95: 36–84.
1935. Social behavior of birds. *In* Murchison, C.: A handbook of social psychology, chap. 20, pp. 947–972, Worcester, Mass.

SELOUS, E.
1933. Evolution of habit in birds. London.

SKARD, A. G.
1937. Studies in the psychology of needs: observations and experiments on the sexual need in hens. Acta Psychol., 2: 175–232.

(SKINNER, K. L.) EDITOR
1922. More light on the habits of the Cuckoo. Oologists' Rec., 2: 64–65.

TINBERGEN, N.
1936. The function of sexual fighting in birds; and the problem of the origin of "territory." Bird Banding, 7: 1–8.

TOMPKINS, G.
1933. Individuality and territoriality as displayed in winter by three passerine species. Condor, 35: 98–106.

VENABLES, L. S. V., AND LACK, D.
1936. Further notes on territory in the Great Crested Grebe. British Birds, 30: 60–69.

WHITMAN, C. O.
1919. The behavior of pigeons. Posthumous works of Charles Otis Whitman, edited by H. A. Carr, vol. 3. Carnegie Inst., Washington, D. C.

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TERRITORY AND POPULATION IN THE GREAT HORNED OWL[1]

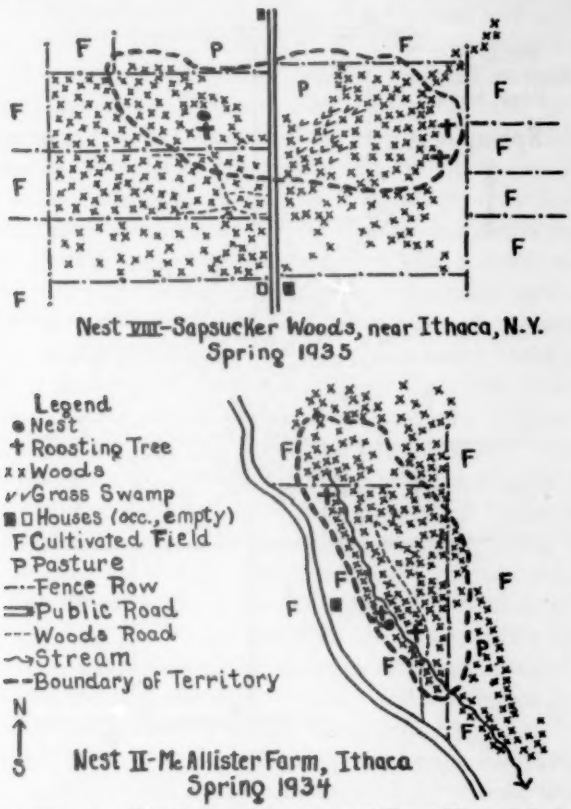
BY FREDERICK M. BAUMGARTNER

THE distribution of most raptorial birds during the nesting season indicates that they set up relatively large territories from the limits of which all other individuals of their kind are vigorously excluded. In few species is this habit more conspicuous than in the Great Horned Owls, *Bubo virginianus*. Field studies at Lawrence, Kansas, during 1932 and the spring of 1933, and at Ithaca, New York, from the fall of 1933 to the spring of 1936 strongly suggest that this intolerance to overcrowding is an important factor in determining the density of population. All the evidence available indicates that the Great Horned Owl holds a definite territory throughout the nesting season and that in many cases the male takes up his station in this area in the late fall or winter before the period of courtship and mating begins. Certain individuals appear to roost regularly in the same place throughout the year, but since they are not always found in their usual 'hideouts' it is questionable if the territorial instinct is operative during a period of several months following the nesting season. In addition to patrolling the nest territory against all invaders the owls apparently restrict their hunting to this same area. Occasionally a bird may go on a longer foraging trip, but at nests where unhoused poultry is not available within a half mile or so such raids are rarely or never undertaken.

A number of field observers have noted the fact that Horned Owls have definite limits to their range. Ridgway (1874) states that these owls rarely go more than a mile from their nests and then only for food. Bendire (1892) quotes Denis Gale as follows: "Each pair of these birds has their particular range and no amount of harassing or robbing them of their eggs two or three times a year will induce them to leave a locality once chosen. The food supply, of course, is the chief consideration influencing their choice. In some cases half a mile of creek bottom defines the limit of their preserve or hunting ground, and occasionally it is larger . . . A choice of location once made is never abandoned unless civilization blots out the cover or kills the birds." Miller (1930) made observations indicating that two Pacific Horned Owls had definite territories which they held in late June. Each bird appeared to patrol an irregular-shaped area with the longest diameter approximately half a mile. An attempt was made to bring the two birds together by 'hooting' from a point between their territories but the effort met with no success. Apparently both birds respected the rights of their neighbors and neither would approach closer than seventy-five yards from this boundary.

[1] Part of a Doctor's thesis presented to Cornell University in August 1937.

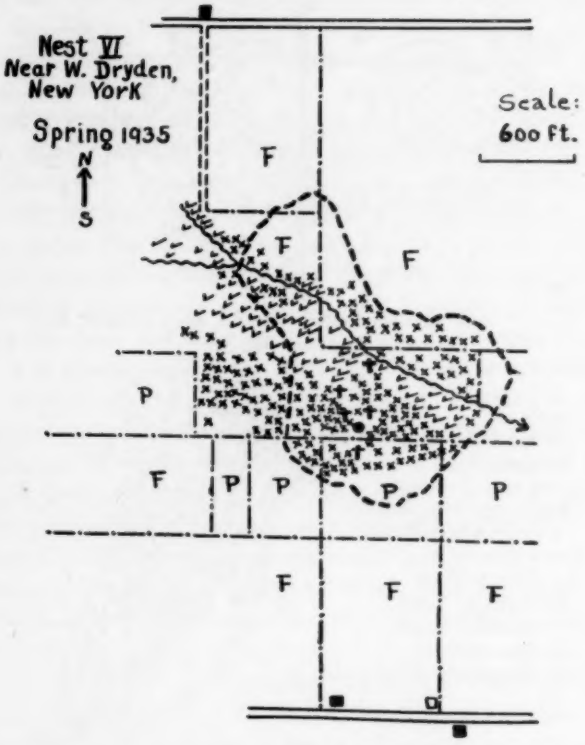
The range of both male and female birds was checked carefully at four nests near Ithaca, New York. From night observations in blinds it appeared that at dusk and again at dawn the male made a circuit about the limits of its domain, hooting from perches at several points in the territory. Furthermore, the areas patrolled by the male also served as feeding grounds



TEXT-FIG. 1.—Territories of two pairs of Great Horned Owls.

for the pair and they seldom, if ever, went beyond these limits. These areas were mapped by plotting all the sight and sound records obtained during many nights spent in blinds near the nests as well as by making a careful analysis of the possible sources of all food items that were brought to the young or were identified in pellets found beneath the roosts of the adults during this season. In no case did the size of the feeding range have a radius exceeding one-fourth of a mile in any direction from the nest, but obviously the individual characteristics of the topography and the availability of food in the immediate vicinity are important factors determining the range

of each pair. It is worthy of mention at this time that the birds were far removed from others of their kind and their movements were not affected by the activities of close neighbors. The territories have been mapped and the extent and type of environment for three may be determined from an examination of Text-figures 1 and 2.



TEXT-FIG. 2.—Territory of a third pair of great Horned Owls (legend as before).

A peculiar characteristic of Horned Owl territories is that there are normally no other species of large owls nesting or feeding extensively within the limits of *Bubo's* range. This feature was very conspicuous at Lawrence, Kansas, where the Horned Owls were generally common along creek bottoms south of the city. I noted that Barred Owls also seemed to be numerous in these regions, but that they were located along the stretches of the creeks where no Horned Owls were seen or heard. Two pairs of Barn Owls were also discovered and they, likewise, had chosen what appeared to be less favorable ranges where no *Bubos* were in evidence. Perhaps this rela-

tionship is due to the fact that the Horned Owl will at times kill and eat its smaller relatives, or it may be that the larger species drives such competitors from its feeding grounds. In either case *Bubo* apparently prefers to live alone with its mate and usually has its way in the matter.

For a period after the nesting season is over and the young have learned to take care of themselves the Great Horned Owls seem to lose their territorial instincts entirely. The juvenile birds leave the nest woods and wander away, often for considerable distances, judging from the findings of Errington (1932a) and the banding returns assembled by Lincoln (1927). The adults are apparently more sedentary, but they, too, shift about over a much wider range than during the nesting season. A limited number of observations in July and early August when the adults were still bringing food to tethered juveniles strongly suggest that the instinct of home range was waning or entirely lost. Adults were flushed from roosting sites during the day or heard at night outside of the limits of the range which they had held during the previous three or four months. This is the season when game farms and hunting preserves suddenly notice heavy losses from some form of predator and in many instances Horned Owls and other owls and hawks prove to be the agents of destruction. Lawrence, Kansas, provided a good demonstration of this post-nesting-season movement. Trapping results over a two-year period in that region revealed a marked change in local owl distribution during the period from the first of August to the end of October or mid-November. By trapping intensively during the winter and spring practically all of the resident owls had been removed in certain areas where *Bubos* were conspicuous and apparently nesting so close together that their territories were limited on one or more sides by those of their neighbors. Furthermore, I had spent many hours at night tramping over the hills and through the creek bottoms and was reasonably certain that Barred and Barn Owls were absent in the trapping areas.

Gradually a few owls appeared in my traps in August and early September, and then suddenly the region was invaded by Barred and Horned Owls. I caught approximately ten of each species during a two-week period. Field observations added further evidence that the owls were shifting about at night, moving up and down the valleys in considerable numbers. Unquestionably a large percentage were birds of the year but of the birds captured, a number gave every indication of being adults.

Mr. Frank C. Edminster, formerly with the New York Bureau of Game, has made the trapping records at the Connecticut Hill Grouse Preserve available to me, and the results are essentially similar to those outlined above. There appears, however, to be considerably more movement of the birds in winter, due probably to the invasion of birds from more northern areas. One season's record showed an appreciable catch of birds in April

at Connecticut Hill. This observation is difficult to interpret unless such birds were unsuccessful in securing mates for that season and shifted their range after nesting had started.

The question of how far resident birds range in the post-nesting-season movement can be satisfactorily answered only by data from banded adults. Unfortunately sufficient information is not yet available. Field observations at this season give very meager returns. A few sight and sound records of several pairs in the Ithaca region lead me to believe that the adults may range over several miles of cover during this period but do not normally desert the region in which they are accustomed to nest. The roosts found in the Ithaca region gave further evidence that the birds were shifting considerably, probably influenced by the availability of food. Pellet collections were small and scattered. A roost at Connecticut Hill was an exception, for it appeared that a bird or two had used the same clump of pines regularly for over a year. I have found no evidence that resident birds tend to band together after the young are shifting for themselves. This preference for solitude may be due to their natural intolerance of others of their kind or to a retention of the territorial instincts. This period of wandering apparently terminates sometime during the fall or winter. In the case of northern owls that move southward over considerable distances, the establishment of a territory does not occur until the nesting season is at hand. Certain resident birds likewise wait until the nesting season before setting up a domain.

Ridgway (1874) notes that Horned Owls may select nesting sites and build new nests or repair old ones as early as September or October. The birds, he states, roosted in the immediate vicinity until the following spring. Errington (1932a) checked seven territories where sight records or the accumulation of pellets clearly indicated that the roosts had been occupied during the fall, several months before the mating season actually started. In each case a bird (the male?) took up roosting quarters near a nest that was later occupied. However, in one case the region was not inhabited by Horned Owls until a short time before a nest was selected and incubation begun. I made a similar observation on one pair near Ithaca in the spring of 1936. A nest was under observation in Sapsucker Woods the previous spring and that winter a pair were still in the same locality. However, they apparently never roosted near the nest site until some time after the 20th of February when they took up a roost in a white pine only four hundred feet from the old nest. This pair chose a nest perhaps one hundred feet from the old situation and of the same open type in a beech tree. Incubation was in progress by the end of the first week in March, possibly earlier.

At Lawrence, Kansas, three males apparently roosted in their territories throughout two winters. I learned to distinguish between the males by

differences in their notes and do not believe that the birds left their narrow limits at all frequently, for in spite of the fact that the surrounding country was trapped intensively, these individuals were not caught and apparently found mates and nested both years. One bird in particular was flushed from a grapevine tangle during every month of the year. There were days when it was not found in this retreat, but during a period of over a year and a half it was seen there more often than not. During the late fall and winter another bird, in all probability its mate, could often be located in a nearby clump of vines and young birds were heard close by in the late spring.

The New York Bureau of Game (1937 mss.) has had returns from three Horned Owls that were released several miles from their points of capture. The January release within two weeks moved five miles back to the point where it was trapped. The bird released in February was trapped at the end of July at the original site of capture. Another owl, transported and moved ten miles in mid-December 1936, was retaken closer to the point of capture but not in a direct line between the banding and release locations. Perhaps the territorial instinct had not yet developed in this individual bird. All these observations suggest that the birds usually select territories at least several weeks before courtship and mating occur. Whether these areas have definite boundaries so characteristic of the nesting season, has not been determined.

The most satisfactory basis for an estimate of Horned Owl populations is of course the number of nests found. However, the location of hooting males and signs about roosts offer a good index to the distribution and numbers of breeding birds. No published figures on numbers of nesting Horned Owls have been found. Dr. Errington (in correspondence) has assembled a considerable amount of information about Horned Owl populations in several areas in south-central Wisconsin and central Iowa. He found the greatest density in wooded creek-bottom lands near Ames, Iowa. In these localities he estimated the population to be better than one pair of birds per two square miles.

Mr. Lee Fisher, of East Lansing, Michigan, informed me that there was approximately one Great Horned Owl per square mile over an area of ten square miles in the Pigeon River State Forest in the northern part of the Lower Peninsula of Michigan. His figures are based on field studies during the spring of 1936. A veteran trapper in the same region has plotted roughly the locations of nests on a map of the same area. Over a twenty-year period his observations indicate a similar number, approximately one pair to every two square miles. This wildland area is made up of aspen- and hardwood-covered hills with dense cedar and balsam swamps in the valleys and extensive openings that were formerly cultivated or pastured.

Mr. O. C. Furniss (in correspondence) has sent me his summary of nests

found on twenty-five quarter-sections of land near Prince Albert, Saskatchewan (*B. v. subarcticus*). He describes the region as rolling country with numerous sloughs and potholes. The land has been cleared extensively during the last twenty years and aspens are at present the chief tree species. On this area he found five nests in 1933, five in 1934, six in 1935, and four in 1936.

My own records of hooting males in a few very favorable localities south of Lawrence, Kansas, indicate a considerably higher population. On three sections of land that offered a habitat of heavily wooded creek banks bordered by small cultivated fields and pastures, there were at least three or four males to the square mile. However, in any area of five square miles the average did not exceed two males per square mile, and there was some evidence to indicate that the males did not always find mates and successfully nest. Nevertheless, I am convinced that two pairs to the square mile is a conservative estimate in the best habitat in that locality.

In the region about Ithaca, New York, due to the rugged topography and dense cover, it was difficult to locate and plot the distribution of territories of the Horned Owls and my figures may be subject to considerable error. Here there was a large rural population on small farms, numerous towns and an abundance of hunters and marksmen to whom the Horned Owls are vermin and a desirable target. These conditions are probably responsible for the relative scarcity of these birds in the areas under observation. The population over the twenty square miles with which I am familiar did not, I believe, average more than one pair to three or four square miles during the springs of 1934 and 1935. Perhaps there are larger populations in areas in the West where rodent numbers are comparatively high. An analysis of nest locations described from all parts of the species' range strengthens my own observations that Horned Owls prefer large timber bordering bodies of water and surrounded by openings in the form of grasslands, brush, or cultivated fields. A location within a few hundred yards of farm buildings is preferred, probably due to the fact that Norway rats and other rodents are attracted to such spots. In the northern part of their range these owls are usually associated with conifers which serve as winter roosting sites while in the South large hollows in trees or dense growths of shrubs or vines offer concealment during the day.

What then are the limiting factors in the density of population of the Great Horned Owl? The unusual ability of these birds to capture a majority of the land vertebrates in any area, coupled with their willingness to take what is available raises a serious doubt in my mind that lack of food is an important factor over much of their range. The young are supplied with an abundance of food throughout their nest life and apparently all of this is often obtained from a relatively small area. Nest sites are abundant and

well distributed in many localities. The Horned Owls are noted for their adaptability in finding locations in which to nest. Both the young and the adults are remarkably free from natural enemies or other natural agents of destruction. Furthermore, there is no evidence to indicate that disease or parasites are important mortality factors, although birds are occasionally found dead in the wild (Errington, 1932b). Removal of cover or molestation by man have unquestionably been the chief factors in the reduction of numbers of Horned Owls. In those areas where the birds have diminished up to the point of extirpation, civilization has so modified the habitat that it no longer conceals the birds from man and other enemies or furnishes them with an adequate food supply.

In areas where food and cover are optimum and human interference is negligible the chief limiting factor is, it appears, the definite territorial requirements of the males. At Lawrence, Kansas, it was noted during both springs that the males in the preferred creek bottoms usually hooted from perches approximately one-fourth to one-half mile apart. On moonlight nights before the nesting season began, as many as five or six males could be heard from one location. At times they approached within a much shorter distance of one another but their first challenges in the evening and their salute to the sun in the morning indicated a rather uniform distribution.

Does the male resist trespass upon his claims by fighting off the intruder? On a few occasions I heard vocal outbursts which indicated that the owls were much excited. No wilder and more blood-curdling scenes can be imagined than those suggested by these cries. On one occasion I managed to slip up within two hundred feet of such a disturbance and could hear the beating of wings amid the bedlam of hoots and screeches. I did not locate the birds themselves until my presence was noted and three or more owls drifted off into the night. Farmers in this area reported that such outbursts were not uncommon in late December. In any event the boundaries of each owl's range are apparently recognized by its neighbors and this fact appears to limit the maximum breeding population.

Since the resident Great Horned Owls have definite limits to their feeding ranges throughout most of the year, this fact is of far-reaching economic significance and should be given considerable attention in the formulation of a control policy. It means that with the exception of a few months in the late summer and fall, game farms and preserves as well as poultry raisers should be able to stop the depredations of Horned Owls by the destruction of a relatively small number of birds that maintain nearby territories. Moreover, as our knowledge of the food habits and ecology of this species increases, the conviction is growing that the Great Horned Owl plays a valuable rôle as a destroyer of harmful rodents and should not be killed except as a last resort. The wholesale extirpation of the species in large

areas is not only a waste of time and money, but is also likely to have an undesirable effect upon the populations of those objectionable animals that the Great Horned Owls hold in check. The fact that there is a southward movement of owls in the fall as well as a wandering of the young during the same period, has misled most people into believing that Horned Owls are characteristically wide-ranging forms that should be destroyed at every opportunity.

SUMMARY

1. The Great Horned Owl maintains a definite territory throughout the nesting season.

2. The male's territory is not only patrolled against all others of its species with the exception of its mate and young but also serves as the range in which both birds hunt for food.

3. In most cases resident birds are found near the nest site at all seasons of the year with the possible exception of a few months in the late summer and fall.

4. Normally no other large species of owls are found within the boundaries of the range set up by the male Horned Owl.

5. Horned Owl populations are limited chiefly by human molestation and man-made changes in their environment that result in a scarcity of cover and less frequently in a lack of nesting sites and sufficient food. In optimum range the decided territorial requirements of the males probably determine the nesting density. Populations in such areas seem to average from one to three pairs of nesting owls to the square mile. Over most of the range of the species the nesting density is much lighter.

6. The fact that resident Great Horned Owls throughout most of the year restrict their search for food to a relatively small area has an important bearing upon the economic status of this species.

LITERATURE CITED

BAIRD, SPENCER F., BREWER, THOMAS M., AND RIDGWAY, ROBERT
1874. North American land birds, 3: 66.

BENDIRE, CHARLES E.
1892. Life histories of North American birds, 1: 385.

ERRINGTON, PAUL L.
1932a. Studies in the behavior of the Great Horned Owl. Wilson Bull., 44: 212–220.

1932b. Great Horned Owls dying in the wild from disease. Wilson Bull., 44: 180.

LINCOLN, FREDERICK C.
1927. Returns from banded birds, 1923 to 1936. U. S. Dept. Agric., Tech. Bull., no. 32: 28.

MILLER, LOYE
1930. The territorial concept in the Great Horned Owl. Condor, 32: 290–291.

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NICOLAS DENYS, A FORGOTTEN OBSERVER OF BIRDS

BY ELSA G. ALLEN

THE name Acadia, though familiar to all of us, does not convey a very clear conception of the region's early vast extent, and while Longfellow has memorably pictured for us the grand beauty of Nova Scotia, Evangeline's home, few are aware that in the mid-seventeenth century Acadia included, besides Nova Scotia, all of New Brunswick and Prince Edward Island, a portion of Quebec and a large part of the State of Maine.

It was in this general region that John and Sebastian Cabot were cruising when they discovered the rockbound coast of Newfoundland and claimed the country for Henry VII of England in 1497. Along the same coast, in 1524, came Giovanni da Verranzanno, a Florentine navigator in the service of France, and in 1534 came the famous French explorer, Jacques Cartier, tightening the hold which France had upon this disputed territory. There followed nearly a hundred years during which England and France were competing for supremacy, and in 1621 the Scot, Sir William Alexander, poet and statesman and author of 'Encouragement to Colonies' (1625), received from the King of England a grant of Acadia with permission to colonize, although at this time it actually belonged to France. He established a colony at Port Royal in 1629, and in 1630 a second expedition with colonists, including the elder La Tour and his English wife, came to Port Royal to take possession of the baronetcy of Nova Scotia under Sir William Alexander who was governor of the whole. This marriage presupposed allegiance to the British crown, and the younger La Tour, holding another baronetcy along the coast, also was expected to give homage and service to the British King. This, however, he refused to do, with the result that Canada and Acadia were restored to France by the Treaty of St. Germain in 1632.

By this time the Company of New France had become a powerful organization in charge of French affairs in America, and a very able commander, Isaac de Razilly, was put at the head of the enterprise of exploring, colonizing and exploiting the great country of Acadia. Alexander's colony at Port Royal surrendered to him, and he fixed his own capital at La Have, a strategic location for the fishing industry and a suitable one also for colonization. Here the first French families of Acadia were planted, and here Nicolas Denys came in 1632 and eventually made himself a leader in the land. He was born at Tours in 1598, of good and rather noted parentage, but early in life was apprenticed to the fishery business and in his thirties definitely took up his life in America, engaging in preparing and shipping lumber and fish to France. The vicissitudes of his life during the renewed hostilities of

the English in Acadia are a long series of hardships and injustices involving the loss of many thousand francs and unwarranted imprisonment which was rendered more bitter by the death of his chief and benefactor, Isaac de Razilly, in 1635.

For many years he lived at Miscou with his family, including two children, kept several gardens, and slowly amassed, through his other business interests a modest fortune. In December, 1653, he went to France and bought from the Company of New France "a grant (with) the coasts and islands in the Gulf of Saint Lawrence from Cape Canso to Cape Rosiers in the Gaspé Peninsula." This gave him a monopoly of the fur trade, and, in 1654, he was made governor of all this territory, including Newfoundland. He controlled also the "sedentary or fixed fisheries as far as Virginia." Thus temporarily securing and having accomplished the surrender of previous commanders in these parts, he was the ranking man of the eastern part of all Acadia and was made governor of it at the age of fifty-six.

After the death of his friend and patron, Razilly, however, and the accession of D'Aulnay, to whom Denys was then subservient, his career was largely frustrated. His gardens at Miscou were seized, and although payment for them was promised, the money was never received. Denys then moved to Nepisiguit, but these properties were likewise seized by Le Borgue, and altogether, through the loss of his fortune and his discouragement incident to continual internal strife, Denys was made to appear an incompetent governor in the eyes of authorities in the homeland, and he went back to France leaving his son Richard in charge of his affairs in Acadia. It was said that he lived in actual want for many years in Paris, but still cherished an abiding affection for his adopted country in America. He returned to Nepisiguit in 1687 and died at his former home in 1688, an old and disappointed but loyal subject of his King at ninety years.

During Nicolas Denys's residence in Acadia, he wrote his experiences in a two-volume work, 'Description and Natural History of the Coasts of North America,' which was published in Paris in 1672. This is one of the most thorough early accounts of the region of Acadia and, although the title in mentioning "Coasts of North America" is far too inclusive, it seems strange it was not given recognition sooner. It passed unread in America for over a century and received its first mention here in the 'North American Review' for 1816; but not until 1908 was it rendered into English and reprinted, through the instrumentality of the Champlain Society, by a professor of botany at Smith College, Doctor William Francis Ganong. Doctor Ganong's Canadian background and scientific training received at the University of New Brunswick and elsewhere, made him appreciative of Denys's knowledge of the plant and animal life of his domain, and since his bird lore has apparently been largely overlooked by ornithologists, I have

gone over his account of the birds to try to gain some appreciation of his powers of ornithological observation back in the late seventeenth century.

His long experience in the fishery, fur and lumber trades gave him above all else a love and understanding of business and his biographer cites the man's chief maxim: "Profit, the chief concern of all men." This does not point to a great aesthetic sense nor does it connote the true scientist. We may therefore expect his observations on birds to be a rather dry unembellished record of what he saw as he practiced his various trades—not literary in quality (and of this the author was aware) but practical, with attention to the market value and gustatory merits of the various species. Nevertheless, his descriptions in most cases embody a great deal of accurate observation of the habits, particularly of the seabirds, and his observations on the landbirds contain much of interest to the naturalist as well as many quaint folk beliefs. Because Denys does not appear to have gained recognition among ornithologists it seems desirable to quote rather fully from his chapters on birds.

p. 266. "It is also worth while to know that upon the Bank, which is twenty [49][1] five leagues from the nearest land, there are to be seen so great a quantity of birds as to be almost unbelievable, such as Fulmars (Happefoye), Petrels (Croiseurs), Guillemots (Poules de mer), Great Auks (Pennegoins), and many other sorts.

"I shall speak only of these particular ones. The Fulmars (Happefoye) are very gluttonous birds. They are thus called because they live on the liver of the Cod. If they see a ship engaged in fishing they assemble in very great numbers around her to seize the livers which fall into the sea. As soon as one of these is thrown in, more than fifty of these birds pounce upon it, and fight among themselves to secure it. They come close up to the vessel, and sometimes one is able to kill them [50] with a pole. Their gluttony makes them easily taken by means of hooks which are attached at the end of a little line, with which the fishermen are furnished on purpose. This line is supported upon the water by a piece of cork, and a fragment of liver is placed upon the hook. This is thrown as far off as possible. Immediately these birds fight as to which one will capture it. After a smart struggle, finally one seizes it, and is caught by the beak, [and] is drawn on board. It is necessary to take great care that it does not seize the hand. Its upper beak is hooked, and passes much over the under. If it bites it pierces the finger or the hand. When it has been taken from the hook and allowed to go [51] upon the quarter-deck, it does not fly away. It does not know how to rise, at least when it is not on the water. This fishery provides a great amusement.

"The Petrels (Croiseurs) are birds which also come to eat the livers, but they do not approach so near. They are called Croiseurs because they are ever crossing on the sea from one side to the other. Their flight is different from that of other birds in this, that they fly, so to speak, crosswise, having one wing up towards the sky and the other towards the sea, so that, in order to turn, they bring the upper wing undermost. It is found always from the time one is at sea a hundred leagues from land as far as New France. [52] A day never passes that one does not see them go crossing from one side to the other. This is in order to find some little fish to eat, of those

[1] The reader may disregard these numbers in brackets which refer to the original French pagination.

which exist between wind and water, such as the Flying Fish, the Herring, the Sardine, and others on which it lives.

"The Guillemot (Poule de mer) is thus called for its resemblance to this land animal. It lives also on little fish and livers. It is not gluttonous, but tamer than the others. It is always flying around the ship, and if it perceives any entrails, it throws itself upon them."

Denys's remarks on the Great Auk are of particular interest since there is no mention of his description of this extinct species in Alfred Newton's 'Abstract of Mr. John Wolley's researches' (Ibis, 1861, p. 374–399) nor in the review of the paper, 'The Gare-fowl and its historians,' by Professor J. J. Steenstrup (Natural History Review, 1865, p. 467–468) nor yet in Hardy's article (Auk, 5: 380–384, 1888). Denys writes of the Great Auk as follows:

"The Great Auk (Pennegoin) is another bird, variegated in white and black. It does not fly. It has only two stumps of wings with which [53] it beats upon the water to aid in fleeing or diving. It is claimed that it dives even to the bottom to seek its prey upon the Bank. It is found more than a hundred leagues from land, where, nevertheless, it comes to lay its eggs, like the others. When they have had their young, they plunge into the water; and their young place themselves upon their backs, and are carried like this as far as the Bank. There one sees some no larger than chickens, although they grow as large as geese. All those birds are [considered] good to eat by the fishermen. As for myself I do not find them agreeable. They taste of oil because of the quantity of fish and of livers they eat; and they serve to make fish oil. [54] The fishermen collect them for this purpose. There are vessels which have made as much as ten or twelve puncheons [a measure of 72 to 120 gallons] of it. This is nearly everything which is practiced in the fishery for green Cod upon the Grand Bank."

Chapter XIX of the second volume is given over to a further discussion of seabirds, or at least the principal ones, for he says " . . . the number is too great for me to remember them all." It is an interesting account but, withal, contains several errors and many omissions, which the editor, Doctor Ganong, has briefly dealt with by means of footnotes. Like most other travellers of this time Denys fell into the common mistake of thinking the American forms like those of Europe, and was primarily concerned with the value of the various kinds of birds as food, although other pertinent facts of interest are included and indicate that he was a good observer. A paragraph on the Brant bears out this statement.

p. 372. "The Brant (Cravan) is scarcely smaller than the small Goose. Its taste is also very pleasant, [303] roasted and boiled, but not salted. It is browner in plumage, the neck is shorter, and there is no white under the throat. It is a bird of passage; it only comes into the country in summer, and it goes away in winter. It is not known whence it comes nor whither it goes. No one has ever seen it producing its young. If it were not for the taste, which is infinitely better than that of the Widgeon (Macreuse)[1] I would say they were the same thing. The plumage is very

[1] This species was permitted as a Lenten dish because of the supposed resemblance of its oil to fish-oil.

much alike, but to eat it in Lent would be too delightful. They live also on grass, with some little shell-fish or worms which are found in the sand.

"The Ducks are all like those of France, as to plumage and goodness. Those which have the wing blue and the feet red are the [304] best. Those with grey feet, which have also the wing blue, hardly differ in goodness. There is another kind of them which has not the blue wing, but they are not so good. There is seen also another species which has the plumage bright brown; of this species the male is white, with black at the end of the wing. The male and the female are never together, and only assemble in spring when they mate. When the females begin to make their nests they separate. The males go in flocks by themselves, and the females the same. If one fires upon the females, unless he kills them entirely dead, they are lost; for so soon as they are wounded they dive, and they seize with their beak any, even the smallest, grass they find, [305] and die there, and do not come again to the surface. They are not good in other respects; they taste of oil like the Widgeon.

"As for the Teal (Sarcelle), it is familiar in France. One knows its value as well as that of the Great Northern Diver (Plongéon), and the Mud-hen, or Coot (Poule d'eau), and this is why I shall not speak further of them. There are seen also quantities of other birds of the big-ness of Ducks, such as the Spoonbill (Palonne), which has the beak about a foot long and round at the end like an oven shovel; the Night Heron (Egret), which has three little feathers straight up on its head; the Sheldrake (Bec de scie), which has the beak formed like a saw; the Long-tailed Duck (Cacaouy), because it pronounces this word for its note; the Buffle-head Ducks (Marionet-[306] tes), because they run leaping upon the water; the Razor-billed Auk (Gode), a bird which flies as swiftly as an arrow, black and white in its plumage; the Cormorant (Cormoran) which devotes itself to the catching of fish. Their neck is tied near the stomach, which prevents them from swallowing, and being thus prevented, they carry their fish ashore.

"There are Plovers (Allouettes) of three sorts. The largest are of the bigness of a large Robin (Merle) of greyish colour, and they have long feet. Others, which are scarcely less large, have the beak longer. Others are like Sparrows and little Chaffinches. All that game goes in flocks together, always along the edge of the sea, where there is any beach. The Sandpipers (Chevalliers) are a kind of Snipe (Beccasse) which have the beak very long. They live [307] on small worms and other things which they find in the sand on the border of the sea. They are of the same size, have legs as long, and the plumage redder than the Small Snipe (Beccassine).

"The Terns or Mackerel Gulls (Esterlais) are other birds, large as a Pigeon, which live on Fish. Flying always in the air, if they perceive their prey they fall upon it like a stone, seize it with their beak and swallow it. The Herring Gull (Goislan) is much larger, lives upon fish and livers or entrails of Cod, but only captures that which is floating upon the sea. There are also a number of others which I do not remember. All those kinds of birds are good to eat, as are also all their eggs, aside from those of the Cormorant. Throughout the country, there [308] are found numbers of Herons (Hérons), which are always upon the borders of the sea or of the ponds, and live on little fish which occur in the holes where the water remains when the tide falls, or (else) on the border of the water in the ponds. They make their nests in the thick woods which occur on islands. They are good to eat and have seven galls and are always thin. As for the young they are better and always fat."

Continuing with the landbirds, Denys writes in Chapter XXI, p. 390:

"The Duck-hawk (Faucon), the Goshawk (Autour), and the Pigeon-hawk (Tierce-

let) have the plumage like those which are seen in France. The claw and the beak are the same. They prey on [337] the Partridge, the Pigeon, and other birds of that strength. The Pigeon-hawk has not a good claw for seizing the Partridge, though it is good for the Pigeon, and for other little birds. There occurs there another kind of Hawk. This captures only fish. It is always flying over water; if it catches sight of some fish it drops upon it more swiftly than a stone can fall. It takes its prey in its claw and carries it off to a tree to devour it.

"There are three kinds of Partridges (Perdrix), the red, the grey, and the black. The red is the best, equal to that of France for flesh and taste. The grey has a different taste from that of France; it suggests venison. Some persons find its taste better [338] than that of the red. As for the black it has the head and the eyes of a Pheasant (Faisan); the flesh is brown, and the taste of venison so strong that I find it less good than the others. They taste of Juniper berries, with a flavour of Fir. They eat of these seeds which the others do not. All these kinds of Partridges have long tails. They open them, like a Turkey, into a fan. They are very beautiful. The red has a medley of red, brown, and grey—the grey of two shades, one bright and the other brown, the black of grey and black. They have been brought into France and given to sundry persons, who have had fans made of them, which have been considered beautiful. They all perch, and are so silly that if you meet with [339] a flock of them upon a tree, you may shoot them all one after the other without their flying away. And indeed if they are somewhat low, so that you can touch them with a pole, it is (only) necessary to cut one, and to attach to its end a cord or a little tape with a running knot, then to pass it over their necks and pull them down. You may take them all alive one after another, carry them home, place them on the ground in a room, and feed them with grain. They eat it promptly, but they must not be able to get out or they will fly away. I have twice tried to bring some of them to France. They stand well all the length of the voyage, but when approaching France [340] they die, which has made me believe that our air must be contrary to their good."

It is interesting to see that Denys took cognizance of three kinds of grouse in his territory. J. L. Peters, in his 'Check List of Birds of the World,' 1934, lists the Spruce Grouse, *Canachites canadensis canace*, and the Canada Ruffed Grouse, *Bonasa umbellus togata*, as characteristic of New Brunswick, and with regard to a third grouse, *Bonasa umbellus thayeri*, he says that it is found in the "Nova Scotian Peninsula, possibly also eastern New Brunswick." Apparently Denys, likewise, recognized this variety as occurring in the Gaspé Peninsula where he lived some two hundred and sixty years ago.

It is a regrettable omission that Denys has not made any reference to the grouse drumming—a feature which usually impressed later travellers. However, so far as I am aware, his account gives the earliest record of the grouse being transported to Europe, and it would seem that this fine species was no more amenable then to artificial environment than it is today.

"There are also Woodcock (Becasses de bois), but they are not common. They are found occasionally at the sources of spring brooks.

"All the Crows (Corbeaux) of this country are wholly black. The note is not the same (as ours). They are also as good to eat as chicken.

"Also Night-hawks (Orfrayes) are met there, not so large as those of France. In summer they are heard crying in the evening. Their cry is not so disagreeable as in

France. They cry mounting in the air very high; then they let themselves fall like a stone to within a good fathom of the ground, when they rise again; and this is a sign of good weather. [341] The Barred Owl (Chat-huant) is of the plumage and size of that of France, and has a little white ruff. Its cry is not similar but there is little difference. All the birds make war upon it. Is better and more delicate eating than the chicken. It is always fat. It feeds upon little Field-mice which are in the woods. It makes provision of them for the winter. It captures some of them, which it places in hollow trees. With its beak it breaks their fore legs in order that they may not escape or crawl out. It collects hay in another tree to nourish them, and brings them every day their provision, whilst it makes its own meals on these little animals in proportion as they grow fat.

"[342] There is also a bird which is called the Robin (Merle). It is related to the Starling (Etourneau) being less black than the [our] Merle, and less grey than the [our] Etourneau. It is not bad to eat.

"One also meets there the Woodpeckers (Piquebois). They have plumage more beautiful than those of France, and are of the same size. There are others which are called Red-headed Woodpeckers (Gays), which are of a beautiful plumage; the head is all red, and the neck of real flame-colour.

"The Humming Bird (Oiseau Mouche) is a little bird no larger than a cockchafer. The female has plumage of a golden green, the male the same, excepting the throat, which is of a red brown. When it is seen in a certain light it emits [343] a fire brighter than the ruby. They live only upon the honey which they collect from flowers. Their beak is long and of the thickness of a little pin. Their tongue passes a little out of the beak, and is very slender. Their flight is swift, and they make a great noise in flying. They make their nests in trees, and these are of the size of a fifteen-sou piece. Their eggs are the size of peas; they lay three of them, or four or five or more. The attempt has been made to rear them, but it has not been possible to bring it about.

"As for the Swallow (Hyrondelle) it is the same as in France. It comes in spring, and returns at the end of autumn. They make their nests in houses, or against certain rocks where they do not get wet.

"[342] The Bat[1] (Chauve-souris) is also of the same sort as that of this country, but is much larger. It retires in winter into the hollows of trees, or among the rocks, and only appears in summer."

It is related by the editor of Nicolas Denys's 'Natural History' that Denys's name is mirrored in a certain ornithological tradition of the Meliseet Indians of the St. John's River who were under the governorship of Denys. According to Mr. Tappan Adney the Indians say that the Veery or Wilson's Thrush, one of the most beautiful songsters of this region, says "Ta-ne'-li-ain ni-ko-la Den'-i, Den'-i?" which is to say, "Where are you going Nicolas Denys?" Adney believes this is an echo of Denys's residence there. His name is probably also perpetuated in the River Denys of Cape Breton Island, but this is not proven, according to Dr. Ganong.

A statue has been suggested to commemorate in 1954 the three-hundredth anniversary of his governorship; this to be placed either at Saint Peters or

[1] The bat is not mentioned in Denys's discussion of beasts, hence it would seem that, like many other early writers, he assumed that it was a bird.

at Nipisiguit (Bathhurst) where his book was written and where his grave is (R. R. MacLeod, Markland or Nova Scotia, Berwick, N. S., 1903, p. 187).

Nicolas Denys, according to Tanguay's 'Dictionnaire Généalogique,' married Marguerite de la Faye, who bore him one son, Richard, and by a later marriage he had a daughter, Marie.

Tradition says that near the great willow on Denys's old establishment some priests and a French admiral lie buried. The editor of his 'Journals,' Dr. Ganong, says: "This Admiral, I believe, is Nicolas Denys. It is a satisfaction to think that here beside this pleasant basin where the least troubled of his days in Acadia were spent, in the last embrace of the land he loved so well, rests the mortal part of the proprietor and governor of all the gulf coast of Acadia, the first great citizen of that noble domain—a goodly man who fought the good fight and kept the faith—Nicolas Denys."

His biographer has graphically likened Denys's book to a photograph slightly out of focus, and this appears to be true of Denys's bird lore, as well as of his general descriptions. While in the main his observations on birds are good, and bespeak a critical eye, they are damaged by an admixture of inaccuracy and in some of his descriptions, for example, that of the wolverine and its method of killing moose, and the Barred Owl and its habit of harboring and caring for live mice, we feel that he was not entirely above the weakness of writing to please his public. Likewise the erroneous distribution of some birds, as the spoonbill, indicated by Denys is proof that his writing was not entirely a record of his own observations, but it contained also a considerable amount of hearsay and folk belief.

Folklore is one of the most picturesque elements of a national literature but one that naturally is but slenderly represented in American literature. Let us therefore appreciate Denys's bird lore for its firsthand observation of many of our northern birds, and let us enjoy it more because of his colorful blending of fact and fancy.

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EFFECT OF WIND ON FLIGHT SPEEDS

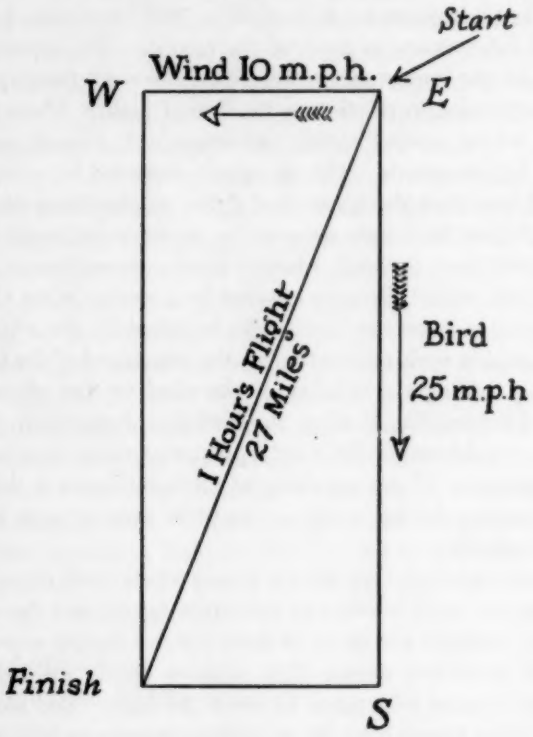
BY FRANCIS H. ALLEN

A CONSIDERABLE amount of data on the flight speeds of birds has been accumulating for some years, especially since the attention of aviators and motorists has been directed to the subject, but a reading of the latest compilation of these data—that made by Miss May Thacher Cooke of the United States Biological Survey and published as a 'Circular' of the Department of Agriculture under date of May, 1937—reveals a lack of certain very material information in most of the records. Few observers seem to have considered the importance of recording the *exact* velocity of the wind and its *exact* direction in relation to the line of flight. These elements are vital factors where ground speeds are concerned, though comparatively unimportant for air speeds. The air speeds recorded by aviators are true indications of how fast the birds were flying at the times of observation, though not of how they were progressing on their journeys. In the case of birds watched from on land, whether from automobiles or otherwise, it is necessarily the actual distance covered in a certain time that is noted; and this distance may be very materially modified by the wind. To ascertain the air speed in such cases—that is, the true speed of the bird—is not a mere matter of adding the velocity of the wind to that of the bird going against it and subtracting it when the bird flies down wind, for that does not take into consideration the vastly greater number of winds that blow from other quarters. I am speaking of birds following a definite course, not simply working farther north or south or east or west in relation to latitude or longitude.

It is a well-known fact that during strong winds birds on migration tend to 'pile up' against such barriers as mountain ranges and the seashore. In the latter case seabirds are swept in from the sea during storms from that quarter, while landbirds during high offshore winds are held along the shore by their natural reluctance to leave the land. But along the shore and in many other places birds fly on definite courses on which it is important for them to govern their flight according to the wind in which they are flying. It is obvious that a slow-flying bird will be reluctant to fly in a strong adverse wind, and even of beam winds any but the gentlest will handicap a slow flyer seriously by tending to blow the bird off its course. Some of the effects of winds blowing from other angles, however, appear to have been very commonly overlooked, though it is all a matter governed by the same law as the composition of forces. A little experimenting with various parallelograms has produced results that have rather surprised me, and it may be worth while to bring them to the attention of others.

Let us assume that a bird on the southward migration is following a coastline that runs due north and south, and that its course calls for its keeping within a definite distance of shore. We may call it a Brown Pelican on the coast of California flying at an air speed of twenty-five miles an hour. Let us assume that a wind of ten m. p. h. arises—what the

FIG. 1
Scale: 1 in. = 8 miles.

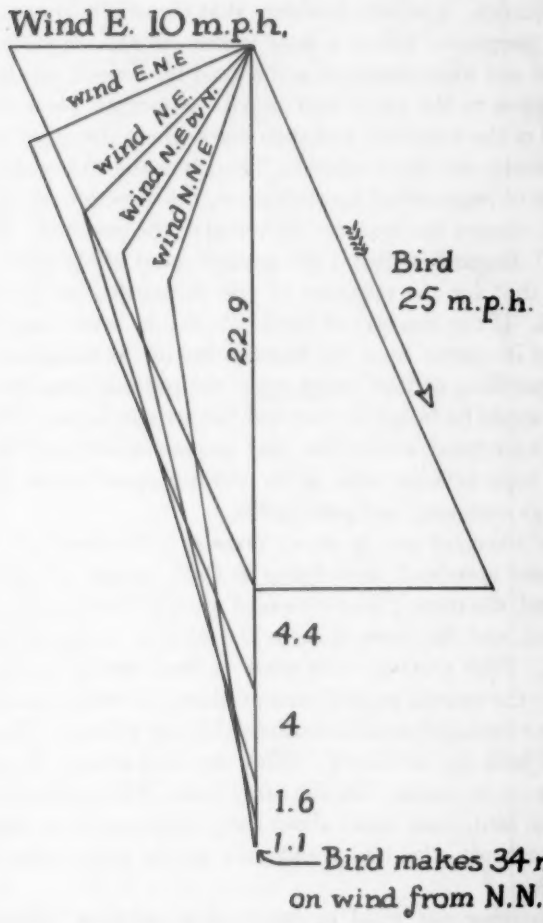


Weather Bureau calls a 'gentle breeze'—and blows from due east. If the pelican were to fly blindly by some internal compass that led it due south, it would find itself after an hour at the end of a diagonal of a rectangular parallelogram twenty-five miles farther south, but ten miles farther west. The bird would have travelled about twenty-seven miles but would be ten miles out at sea (see Text-fig. 1).

But though birds know nothing of parallelograms of velocities, they do know how to hold a course. In this case our pelican would fly about south-southeast to counteract the effects of the ten-mile east wind, and an hour's

flight at twenty-five m.p.h. would take it about 22.9 miles on its southward course (see Text-fig. 2). A shift of the wind to east-northeast would speed our bird up to a gain of 4.4 over the 22.9 miles. Another shift to northeast

FIG. 2
Scale: 1 in. = 8 miles



would gain it another four miles. If the wind shifted another point, to northeast-by-north, the bird would gain an additional 1.6 miles; and a further shift to north-northeast would land it 1.1 miles still farther south, making a total of thirty-four miles on its course. If the wind went round

to the north and blew steadily from that quarter, the southing would be thirty-five miles; that is, the bird's twenty-five plus the wind's ten. (For convenience, except in the case of the east wind, only half of each parallelogram has been shown in the diagram.)

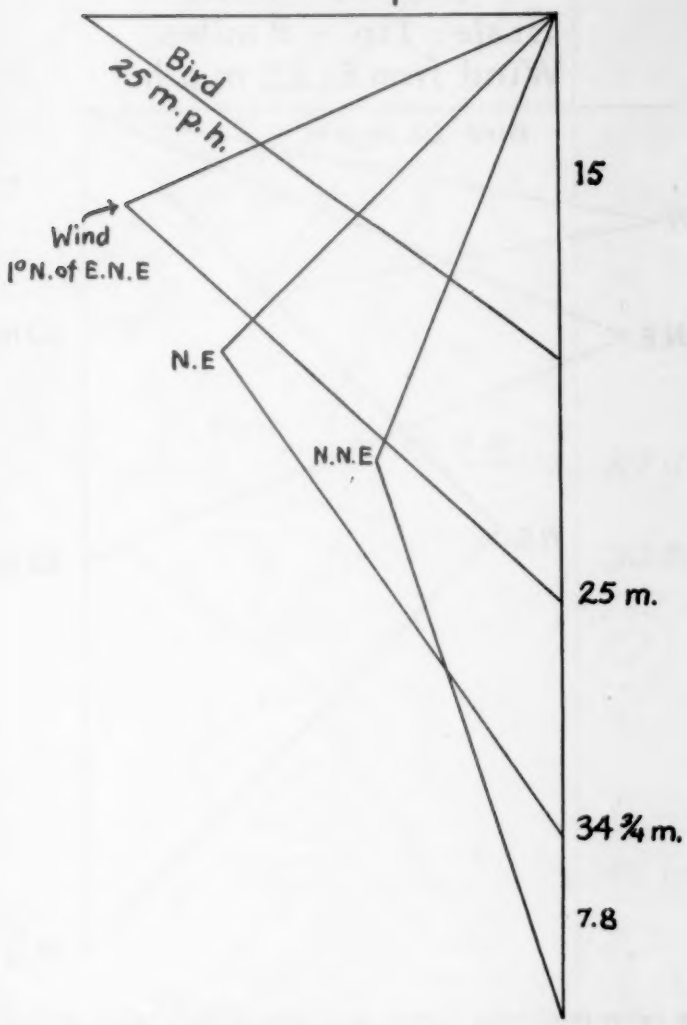
As it may not be clear to all readers just how the parallelograms, or rather the semiparallelograms, or triangles, are constructed, it may be well to say at the outset that they are drawn in the most mechanical fashion by empirical methods employing the simplest instruments and the most elementary mathematics. I believe, however, that the results are exact enough for all practical purposes. Given a fixed course (in this case due south), a fixed wind speed and wind direction, and a fixed bird speed, one has only to spread the dividers to the exact bird m.p.h. on a scale, place one end at the leeward end of the wind line, and then mark where the other end crosses the line of the north-and-south course. This gives the end of the diagonal of the (complete or incomplete) parallelogram, the direction of the diagonal being, of course, always the same by the terms of the problem. The length of the (vertical) diagonal indicates the ground speed of the bird. It must be emphasized that for the purposes of this demonstration the bird's air speeds are fixed. If the measure of the bird's m.p.h. is not long enough to reach the line of its course from the leeward end of the wind line, it shows that the bird travelling at that speed could not possibly keep its course in that wind, but would be blown farther and farther out to sea. As a matter of fact, no bird's air speed is inflexible, and unquestionably any bird finding itself unable to cope with the wind at its ordinary speed would increase its speed as much as necessary and practicable.

But what we have set out to do at present is to show how the wind affects the ground speeds of birds flying at their normal air speeds. The stronger the wind, the more it hinders a bird when it blows abeam or in that general direction, and the more it helps the bird as it approaches the direction of flight. With a twenty-mile wind—a 'fresh breeze' as the Weather Bureau calls it—the neutral point comes at about one degree north of east-northeast for our twenty-five-mile southward-flying pelican. East of that, the wind would hold the bird back. With the wind abeam, it could make but fifteen miles on its course. On the other hand, if the wind should swing to northeast, the bird could make about 34¾ miles; and if it should swing to the north-northeast, the bird could gain nearly eight miles over that (see Text-fig. 3).

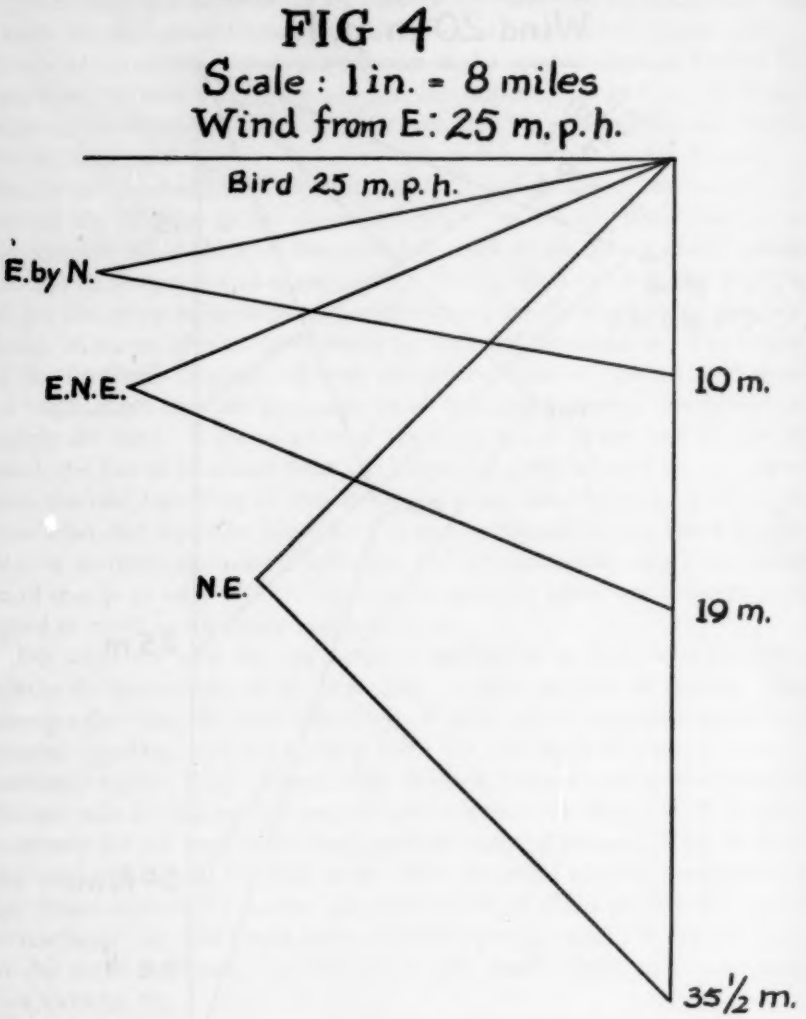
But let us increase our wind to twenty-five miles—a 'strong breeze.' Now our bird could just hold its own in a beam wind by flying directly into it, but of course no bird would fly in such a wind if it felt any urge to keep a course at right angles to the wind. If, however, the wind should swing only a single point, 11¼ degrees, to the north, our southward-bound pelican by

FIG. 3

Scale : 1 in. = 8 miles
Wind 20 m. p. h.



flying at normal speed about ten degrees south of east could gain about ten miles on its course, and that might be worth the effort. An east-northeast wind would net about nineteen miles, and a northeast wind would be distinctly favorable, speeding the bird up to 35½ miles (see Text-fig. 4).



When we are considering changes as small as a single point, we must not forget that no strong wind ever blows steadily from one point of the compass. No one who has watched a weather-vane can fail to have noticed that such winds are constantly veering, perhaps as much as a point or even

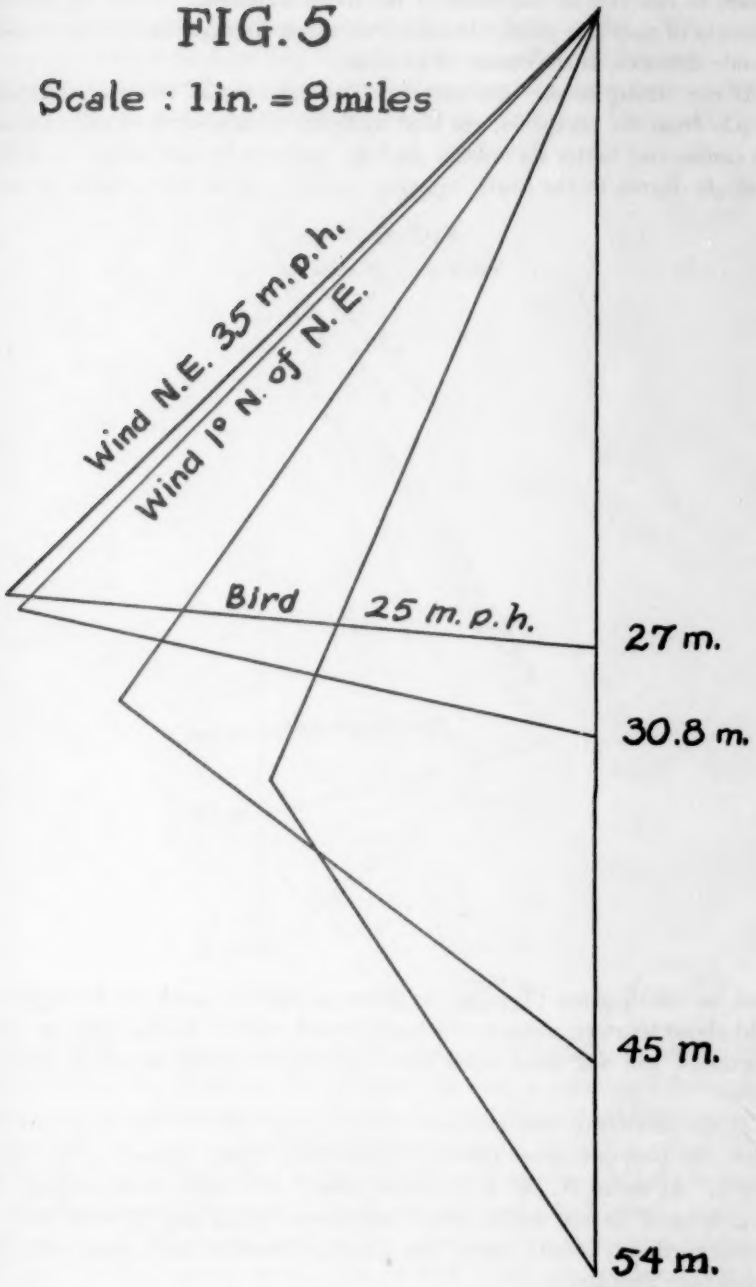
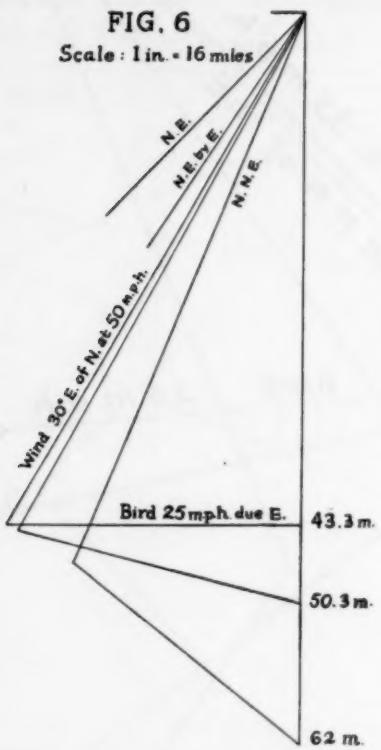


FIG. 5
Scale : 1 in. = 8 miles
Wind N.E. 35 m.p.h.
Wind 1° N. of N.E.
Bird
25 m.p.h.
27 m.
30.8 m.
45 m.
54 m.

more, to one side or the other of the mean direction. When we speak of changes of only one point, therefore, we mean changes that *average* a point in one direction in the course of an hour.

If our strong breeze increases to a 'moderate gale' blowing thirty-five m.p.h. from the northeast, our bird by flying a little south of east can keep its course and better its mileage slightly, perhaps by two miles. A shift of a single degree to the north will now speed it up to thirty miles or more,

FIG. 6

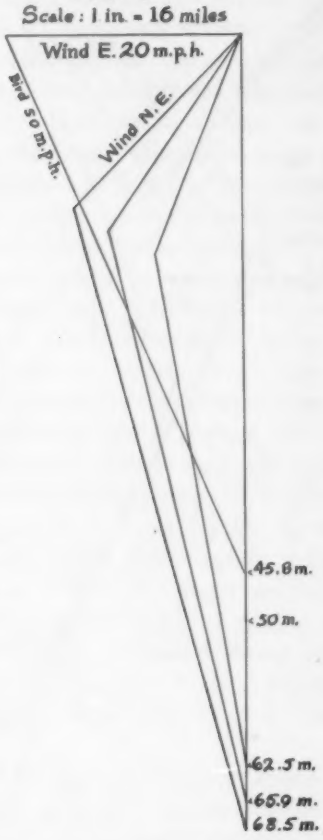


and, as the diagram (Text-fig. 5) shows, a shift to northeast-by-north will add about fourteen miles to the bird's speed, while a further shift to north-northeast will add nine miles more, making the total fifty-four miles an hour.

If the moderate gale increases to a 'strong' one of fifty m.p.h., it will blow our bird out to sea unless it comes from thirty degrees or less east of north. At about N. 30° E. it would take it 43.3 miles on its course. One degree more to the north would add seven miles, and a wind from the north-northeast would carry our twenty-five-mile bird about sixty-two miles (see Text-fig. 6).

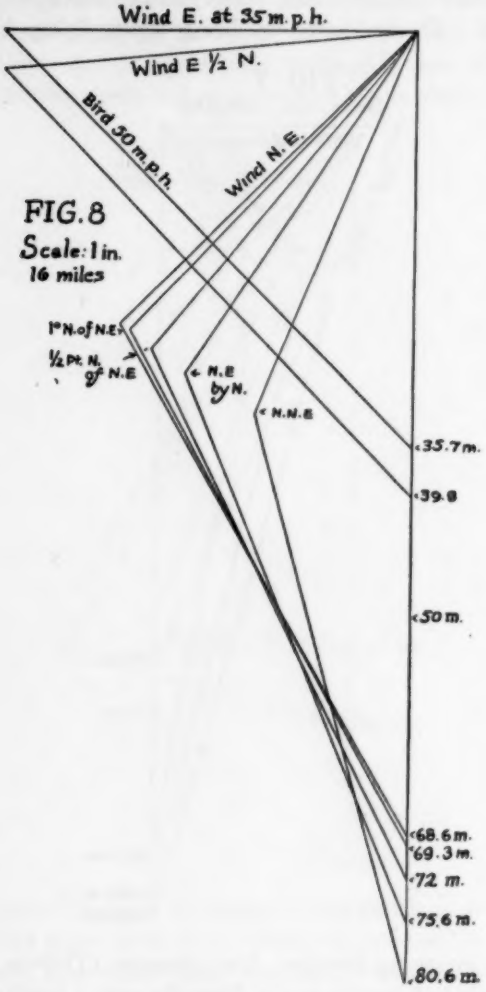
So much for our comparatively slow-flying pelican. Now let us take a faster bird, say a duck with a speed of fifty m.p.h. in a calm. With such a bird a ten-mile wind from any direction can make little difference. At the worst it can reduce the speed only to forty and at best it can increase it only to sixty m.p.h. Ducks, however, being strong-flying birds, may well

FIG. 7



venture forth in strong breezes. Our diagram (Text-fig. 7) shows that, with a beam wind of twenty m.p.h. from the east, a southward-flying duck would make 45.8 miles an hour. The beam wind would thus hamper it, but a northeast wind of the same velocity would speed it up to 62.5 miles. With a wind due east at thirty-five m.p.h. our fifty-mile duck could hold its course by heading a very little south of southeast and make 35.7 miles. A shift of half a point ($5\frac{5}{8}°$) to the north of east would add a little over four miles to what the bird would make with an east wind. A northeast wind at

thirty-five m.p.h. would enable our duck to make 68.6 miles in an hour, and a shift of one degree to the north would give it about two-thirds of a mile more; and so on (see Text-fig. 8).



To see how a fifty-mile wind would affect a fifty-mile bird we have only to double the figures for the twenty-five-mile bird in a twenty-five-mile wind (see Text-fig. 4).

Our diagrams suggest that in a hampering wind a bird heads deliberately in a very different direction from that in which its course would lead it and allows the wind to make the necessary adjustment. It must not be under-

stood that this is what actually happens. We should not expect to see a bird heading straight for shore when its real intention is to parallel the shore. What the bird actually does is to fight every foot of the way and, however this is done, the result is the same as if it steered by compass in the appropriate direction. It is clear, at least, that no more economical way of keeping its course could be devised than by using its full powers of flight in a direction calculated to balance accurately the force of the wind.

As I have said, and as everybody knows, birds' flight speeds are not fixed quantities. We cannot say that *the* speed of the Mallard, for instance, is fifty m.p.h. The air-speed records for this species run from forty-six (plus or minus) to sixty. It should be obvious that even the air speeds of birds are governed by conditions other than their wing power. Meinertzhagen in an often-cited paper in 'The Ibis' for 1921, recorded his conclusion that "birds have two speeds—a normal rate which is used for everyday purposes and also for migration, and an accelerated speed which is used for protection or pursuit, and which in some cases nearly doubles the normal speed." He does not make it clear, however, why he limits his birds to *two* speeds. I think he was intent chiefly on showing that birds possessed a power of considerable acceleration over their ordinary speeds, and had no real intention of asserting that individual birds were actually limited to two fixed speeds. It would seem fairly obvious that even ordinary speeds vary greatly. A pelican feeding would naturally fly in much more leisurely fashion than if it were flying home to its roost, and a small bird flitting from one tree to another could hardly get up the speed it would need for a migration flight. So, too, in the higher speeds, a bird pursued by a hawk would naturally accelerate from fast to faster and faster as the chase became hotter; and would make a greater speed in getting away from a fast hawk than would be needed in escaping from a slower one, because it would be pressed to the limit of its strength. Perhaps for most purposes the most valuable speed records are those that show the very limit of the bird's powers.

Of the 178 records of ground speed—not air speed—listed in Miss Cooke's paper, only twenty-nine make any mention of the wind. Of these, nine report "calm", "still air," or "no wind," and may be taken as valid records for air speed; two say "light air"; five, "wind abeam"; one, "all types of wind"; one, "wind behind"; one, "favoring wind"; one, "gale behind"; one, "strong head wind"; only three give any estimate of the velocity of the wind in m.p.h.; and only one mentions any relative wind direction except ahead, abeam, or behind.

The last-mentioned record, which is also one of the three giving figures for the velocity of the wind, is that of Brown Pelicans by Carl R. Smith published in 'The Gull,' monthly bulletin of the Audubon Association of

the Pacific, in September, 1924. This single record is praiseworthy as an attempt to give exact data, but I must call attention to the fact that it is open to serious question. The timing of the pelicans was done at El Pismo Beach near San Luis Obispo, California, when the birds were flying "south, keeping close to shore." We are informed that the prevailing wind on this stretch of the coast is from the northeast, but no statement is made as to its exact direction at this particular point and time. Mr. Smith goes on to say, "Their speed, in practically calm air, reaches 14 miles per hour; in a half-gale, it rises to 16 miles per hour; with the wind blowing at fifty miles per hour, the birds travel at the rate of 22 miles per hour." Now fourteen m.p.h. in a calm seems very slow for a Brown Pelican. Longstreet's record cited by Miss Cooke for four birds with wind abeam (not a favoring wind) is twenty-six m.p.h., and Meinertzhagen cites a record for another species of pelican of fifty-one m.p.h. with a "side wind" of fifteen m.p.h., which at the very least would mean an air speed of fully thirty-six m.p.h. Moreover it is not stated how Smith's wind speed of fifty m.p.h. was ascertained or just what is meant by "half-gale." It is hard to see, at any rate, how his birds could possibly have flown in a fifty-mile gale from the northeast without being blown out to sea even if they could increase their speed to thirty-five miles. A more favorable wind at anything approaching that speed would have taken them much more than twenty-two miles on their course. I am at a loss to account for Mr. Smith's figures and am sorry not to be able to accept Miss Cooke's explanation, which seems to be founded on the now-discredited theory that a wind blowing horizontally has some mysterious lifting power of its own that makes it easier for a bird to fly against it than with it. It is only fair to quote Miss Cooke's exact words for the benefit of readers who may not have her paper at hand. She seems to have regarded these strong winds from the northeast as favoring winds—whereas it is clear that, blowing at such speeds they must have been seriously hampering, to say the least—and, to account for the comparatively slight gains in flight speed after so great increases of what might appear to be a favoring wind, she says: "The explanation is that in order for a bird to remain aloft it must rest on a current of air against the under side of its wings, and the current must come from the front, not from behind, the backward tilt of the wings catching this wind. These facts are well recognized in modern aeronautics. Both birds and airplanes must take off and land into the wind. Therefore, if the wind is directly behind, the bird must move its wings faster in order to get the necessary upbearing current or else be blown along by the wind without being able to guide its course." This overlooks the fact that the bird, by its progress through the air, *creates* the current on which it must rest. Otherwise it would be impossible for a bird to fly in a calm. As a matter of fact, for supporting a bird in the

air, except for the variations in force and direction of the wind, one way of the wind is as good as another and one velocity of the wind is as good as another. A balloon floats upright in a steady wind as in a calm, and a bird makes the same air speed in a steady wind, whether flying with it, against it, or across it. Whichever way the bird goes, it gets its support from the current of air that it meets and gets no more support from a head wind than from a stern wind, because, being borne along with the wind, the air in which it flies is stationary so far as the bird's movements within it are concerned. Only in landing and in taking off is it important for a bird, as for an airplane, to head into the wind, because then the flier passes from one element to another. (There is also the exception of the hovering bird, which heads into the wind to maintain its position over a particular spot of land or water.) The dislike that birds seem to have for flying with the wind applies, I think—after the first inertia is overcome—only to strong winds, which are accompanied by frequent annoying puffs that ruffle the feathers when they strike them from the rear.

I hope I have shown the importance of fuller and more precise data on wind direction and wind speed in records of the ground speeds of birds. When we consider that a difference of a very few degrees in the direction of a wind may make all the difference between complete frustration and substantial progress for the bird, and that apparently neutral winds become increasingly unfavorable as they increase in strength, we can appreciate the seriousness of the gaps in the published data.

Professor Frederick A. Saunders, of the Physics Department of Harvard University, has been kind enough to read this paper and has helped me with valuable suggestions.

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SUPPLEMENT TO 'THE BIRDS OF ANTIGUA'

BY STUART T. DANFORTH[1]

IN 'The Auk' for July, 1934 (50: 350–364) the writer published a paper on the birds of Antigua, based on field work done there in 1933 and a survey of the literature. Since the time of his visit there has been a great reawakening of interest in birds among local bird lovers, many of whom have sent him much interesting information, frequently accompanied by specimens for identification or verification. Principally by these means, and to a lesser extent by a more careful scrutiny of the literature and of specimens in collections, such a large number of additional records for the island have accumulated that it seems desirable to publish a supplement to the original paper, which listed eighty-one species, exclusive of six which were listed hypothetically. In the present paper six species are added to the definitive list, bringing it to eighty-seven. Only one of these was added by removal from the hypothetical list, and as one is added to that it still stands at six. However, as Mr. Fleming writes me that his White Pelican record was an unaccountable error, it really should be reduced to five by complete removal of this species. Additional information is given concerning a few species previously listed, to clarify their status or to give important new matter regarding them. Thanks are due to the many interested bird observers in Antigua, most of whose names are mentioned in this paper, for making this supplement necessary.

WEST INDIAN GREAT BLUE HERON, *Ardea herodias adoza*.—This species was recorded hypothetically in my previous list. Since then I have been informed of numerous sight records by local observers, and Mr. A. K. Petrie Hay has sent me an adult specimen (apparently male) obtained in January 1937, and prepared by Mr. H. E. Box. Its wing measures 470.5 mm.

BLACK-CROWNED NIGHT HERON, *Nycticorax nycticorax hoactli*.—Although recorded in my previous list, its status in Antigua was very uncertain. Mr. G. O. Nugent has sent me an immature specimen (prepared by Mr. Box) which Mr. Nugent's son shot in a high tamarind tree by a small pond near his house on February 27, 1938.

[WHISTLING SWAN, *Cygnus columbianus*.—A swan which was apparently an immature Whistling Swan, appeared at the Corbizon Point swamps on December 18, 1937, and was repeatedly seen on many occasions from then until the last week of February 1938, by many observers, including Mr. A. K. Petrie Hay, Mr. A. F. A. Turner, Mr. H. E. Box, Dr. L. R. Hutson, Mrs. H. M. McDonald and others, some of whom have sent me very minute descriptions of the bird. Due primarily to the efforts of His Honour, J. D. Harford, Administrator of Antigua, assisted by others interested in Antigua bird life, an Order-in-Council protecting swans was passed in

[1] Posthumous paper. Dr. Danforth died November 25, 1938.

record short time, and published in a special edition of the official 'Leeward Islands Gazette' with the express object of protecting this bird. Due to the fact that the bird was not collected, and to the absence of other West Indian records of the species, it is listed hypothetically, despite the detailed descriptions received.]

BALDPATE, AMERICAN WIDGEON, *Mareca americana.*—Mr. H. E. Box prepared and sent to me the head and wing of an example of this species shot by Mr. A. F. A. Turner at Corbizon Point on February 28, 1938. It was evidently an immature male, and constitutes the first record for the island.

BLUE-WINGED TEAL, *Querquedula discors.*—Mr. Box has sent me the wing of an example shot by Mr. A. F. A. Turner at Corbizon Point during the last week in December 1937. Previously it is not recorded definitely from the island. A "teal duck" shot at Cook's Estate October 28, 1937, bearing a band of P. Skovgaard No. M 2640, reported by Mr. A. K. Petrie Hay, had been banded earlier that year in Iceland. Without having seen the specimen or complete particulars I cannot say if this record pertains to the European Teal (*Nettion crecca*) or to some other species.

WILSON'S SNIPE, *Capella delicata.*—Included in my previous list on the basis of rather indefinite reports, published and otherwise, all unsubstantiated by specimens. I now have in my collection a specimen shot at Corbizon Point on February 9, 1938, by Mr. A. F. A. Turner, and prepared and sent to me by Mr. Box.

ZENAIDA DOVE, *Zenaida aurita zenaida.*—Specimens of this genus from Antigua in various collections range from typical *zenaida* to typical *aurita*, with the majority intermediate. The male in my collection obtained near Morn's Bay, August 1, 1933 (which I previously regarded as an intermediate), upon more careful examination I regard as typical *zenaida*, a form not previously recorded from the island.

BELTED KINGFISHER, *Megaceryle alcyon alcyon.*—Due to the paucity of exact migration dates in this region, it seems of interest to record that Mrs. H. M. McDonald noted this species from the middle of September 1937, until April 26, 1938.

BLACK AND WHITE WARBLER, *Mniotilta varia.*—Due to some unaccountable oversight, this species was not included in my previous list, despite published records by Nicoll and Riley. Mr. G. O. Nugent and Mrs. H. D. McDonald report seeing it regularly from November to April, the former recording dates up until April 14, 1938.

BLACKPOLL WARBLER, *Dendroica striata.*—Another species which was overlooked in my previous list. Nicoll (Ibis, 1904, p. 574) records a specimen given him by Branch.

MYRTLE WARBLER, *Dendroica coronata.*—Mr. G. O. Nugent has sent me a very accurate description of two individuals which spent some time near his home in the winter of 1937–38, and which he observed at very close range, the birds even entering his bedroom on occasion. Not previously recorded from the island.

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NESTING OF SOME PANAMANIAN BIRDS

BY C. BROOKE WORTH

STREAKED TREE-HUNTER, *Thripadectes rufobrunneus*.—On August 4, 1937, I found a nest on Finca Lerida, the coffee plantation of Señor Tollef B. Mönniche, at 5000 feet elevation near Boquete, Province de Chiriqui, Panama. Sr. Mönniche is much interested in ornithology and has bought large tracts of forest in the mountains above his plantation, protecting them against invasion by woodcutters. One of the trails which his men have made to these forests descends steeply from a wooded plateau into a humid *oroya* or gorge, through which flows the Velo, one of the upper tributaries of the Rio Caldera.

Along this trail, at 5400 feet, there is a bank of volcanic ash where the trail-makers had to cut into the mountain-side. This cut, about six feet high, is practically vertical; erosion is prevented by the abundance of roots which knit the ash and rock together. It flanks the trail on one side; on the other there is a sharp drop into the narrow Velo. The Velo is cool and crepuscular by day and is characterized by a rank vegetation among which the cecropia and a spindly 'cabbage' palm are conspicuous. This is the habitat of *Scytalopus argentifrons*, *Pachyramphus versicolor costaricensis*, *Henicorhina leucophrys collina*, *Myadestes melanops*, *Turdus plebejus plebejus* and others also characteristic.

There were many burrows in the bank, of various diameters and depths, the average being closely similar to Belted Kingfishers' excavations in the United States. From one of these, at the top of the bank where the roots of a tree caused a slightly overhanging shelf, I saw a brown bird fly. It alit in a tree close by, and I saw that it was a species of ovenbird. Investigating the burrow, I found that it led upward at a gentle grade for eighteen inches and then turned sharply to the right and slightly downward, opening at once into a chamber about eight inches in all its diameters. Here was a nest containing two warm eggs. When I looked about, the ovenbird had disappeared, so I withdrew for the rest of the morning. Returning about noon, I saw the bird fly out when I was about twenty-five yards away. It flew to the same nearby tree and I shot it. Then I collected the eggs from the nest and drew the nest itself out of the hole. One expects to find a flimsy nest at the end of a burrow, but in this case I was able to pull the structure through a passageway of smaller diameter than itself, to have it spring firmly back into shape as soon as I had drawn it out. It was made entirely of medium-sized rootlets of wiry texture, woven very compactly together. It was about six inches in diameter, one and one-half inches thick, and almost flat.

The eggs were dull white with little gloss and no other markings. As they lay in the nest, the effect was that of a dove's nest. They each measured 33.5 x 23 mm., and seemed very large for the size of the ovenbird. Incubation was almost complete.

The bird which I collected, and which was incubating at the time, was a male, with testes enlarged to full breeding size. This specimen, as well as the nest and the eggs, are now in the ornithological collection of the Academy of Natural Sciences of Philadelphia.

SALVIN'S THRUSH, *Turdus assimilis cnephosa*.—This is a common bird at 4000 feet elevation in the forests and clearings along the Rio Garaché, Province de Chiriqui, Panama. On June 26, 1937, I found its nest, situated about five feet from the ground in a crotch of a small coffee tree. In the very next coffee tree was an unoccupied nest of *Synallaxis brachyura nigrifumosa*, while in a nearby banana tree a *Glaucis hirsuta aenea* was incubating its two eggs.

The thrush's nest was a compact bulky structure, with a scanty foundation of coarse dead grass and an elaborate superstructure of living green moss. This flourishing exterior, amid which two small ferns were also growing, was an excellent camouflaging device, for the same moss grew abundantly everywhere, frequently forming natural masses, in appearance similar to that of the nest. On feeling the walls of the nest I failed to detect mud in its architecture. Its lining was of fine rootlets. The cavity was deeply cup-shaped. There were two eggs, measuring 21 x 29 and 22 x 28 mm. Their ground color was almost white, tinged with a very pale and diluted green. They were heavily spotted with small dots of russet, so thickly clustered at the blunt end as to become confluent.

When I first found the nest, one of the parents was incubating. It had large dark eyes, rimmed conspicuously by yellow eyelids. Its beak was shorter and stouter than is usual among thrushes, but the streaks on its light throat seemed quite Robin-like. It waited until I was within ten feet of the nest, watching me intently, and then darted down into the undergrowth. There it ran away as silently and unseen as a rail, for I did not see it again that day. Nor did it make any remonstrance on any of my visits during the following week of incubation.

On July 3 the eggs hatched. The young were adorned by a few tufts of long buffy down. A parent flew off as I arrived and for the first time showed some concern at my presence. Reaching a perch about fifty yards away, it uttered a soft note which sounded like *pyew pyew* several times and flirted its wings and tail in a very Robin-like fashion. It elected to do this, however, at some distance from the nest, and the outcries, although displaying anxiety, were subdued and cautious. The bird showed none of the unrestraint so typical of Robins in the United States.

I was unable to make further observations on this nest, since I soon left the Rio Garaché vicinity. But my friend, Samuel L. Cresson, collected the female parent and one of the fledglings for me on July 17. The other fledgling had already flown. These two specimens and the nest are now in the ornithological collection of the Academy of Natural Sciences of Philadelphia.

CHIRIQUI CHLOROSPINGUS, *Chlorospingus ophthalmicus novicus.*—This tanager builds a globular nest with a concealed opening at the top. This is not only an unusual nest for a tanager, but also an exceptional type of doorway among birds of the Rio Garaché region, Province de Chiriqui, Panama, for at this elevation (about 4000 feet) there is heavy rainfall in the forest belt, and most species which build spherical nests there provide them with entrances situated well below the equator of the sphere. Such a plan, which succeeds in keeping the rain out, is followed by most of the wrens and several of the ovenbirds and woodhewers.

I found the nest of this *Chlorospingus* on June 28, 1937; it was about nine feet from the ground in a tall coffee tree. The discovery was purely a chance affair, for I was making a routine investigation of all the mossy spheres in the coffee grove; almost all of them were nothing but naturally growing moss. Besides, I had previously seen *Chlorospingus* only in the forest, but it seems that many forest species become adapted to the edges of clearings. As I touched this sphere a small olive bird darted out. Bending the tree over, I found that the scarcely visible opening at the very top of the nest led into a deep cavity, lined with a few dry strips of dead banana leaves.

There were two eggs in the nest, nearly round, measuring 21 x 17 and 21 x 17.5 mm. They were white with a moderate sprinkling of pinkish-red dots, concentrated at the blunt end so that on one egg they became confluent as a large reddish blotch, mottled and irregular in shape.

The parent bird flew nervously about in nearby trees, coming close enough for me to see its conspicuous white eye-stripe. It made small sharp scolding noises, something like *tsit tsit.* On July 6, one of the eggs hatched; the other contained a dead embryo. The fledgling was pink with tufts of rather long down, dark grayish, tipped with buff.

As I approached the nest on this day I noticed great excitement among the birds in the vicinity. I could find no other cause for it than my own intrusion, though I searched for a marauding cat or other mammal. As I drew near a pair of *Megarhynchus,* a *Myiodynastes,* a *Centurus,* and several smaller birds joined the two *Chlorospingus* in protesting against my presence. The *Megarhynchus* swooped at me, flapping their wings loudly, and uttering harsh calls, like *karr-r-r karr-r-r.* This occurrence was not repeated

on my subsequent visits to the nest and may therefore have betokened young flycatchers—rather than tanagers—in the vicinity. It was, moreover, the only instance resembling a marked parental demonstration which came to my notice during a summer of ornithological work in the Chiriqui region. I would be much surprised if the other birds had been thus aroused to excitement by the visible anxiety of the tanagers.

I made further observations on this nest until July 11, when I left the Rio Garaché. Subsequently the single fledgling flew, and the nest was collected for the ornithological collection of the Academy of Natural Sciences of Philadelphia by Samuel L. Cresson.

COSTA RICAN BLUE GROSBEAK, *Cyanocompsa cyanoides caerulescens.*—On June 29, 1937, I found a nest of this bird in the Rio Garaché forest, a few miles from El Volcan, Province de Chiriqui, Panama, at about 4100 feet elevation. It is one of the few fringilline species that are characteristic of the heavy forest habitat at this altitude, the only other common one being *Arremon a. aurantiirostris.* At the forest's edge two miles away, on the llanos beyond, and even in coffee-plantation clearings of sufficient size within the forest itself, the Fringillidae become one of the predominant elements in the avifauna.

The nest was in a small sapling at the edge of a forest trail. It was about seven feet from the ground and appeared rather flat from the outside, but in reality it was deeply cupped within. It was loosely built of coarse sticks and stalks, with a slightly less-coarse lining of roots and grasses.

When I discovered the nest, the female parent was brooding the two eggs. On this and other occasions she sat very close, not flying until I had practically touched her with my hand. If I circled around the sapling at a short distance, she would turn slowly about in the nest so that she always faced me. When forced to fly, she would dart into a thick bushy copse a short distance away. There I once glimpsed her through a binocular and saw that she was 'feigning' a broken wing. On no other occasion, however, did I see her evince any symptoms of anxiety. Once I waited forty minutes for her to return to her eggs; she took up a station close to me, but behind a large heliconia leaf, and sat there absolutely motionless and silent until I gave up the vigil.

The eggs each measured 25 x 19 mm. They were white, sprinkled rather sparsely with round dots about 1 mm. in diameter; the dots were of two colors, russet and light tan, the russet ones being by far the more numerous. On July 2, the eggs were newly hatched. The young had a sparse covering of down, dirty gray-brown in color.

The fledglings had a short life. On July 6, as I passed the nest, a hawk flew from it into a neighboring tree. Looking at the hawk through my

binocular, I saw that it was devouring one of the young birds. I quickly shot the hawk and then looked into the nest. Unfortunately the hawk had mutilated the other fledgling and it was dead; there were no lacerations upon it, but a large hematoma on the back of its neck was evidence of the hawk's work. The hawk was a male *Micrastur ruficollis interstes*, a beautiful bird with a slaty back and barred reddish-brown breast. The legs and feet were bright yellow, and the claws were brown. The beak, from nostril to tip, was brown. The cere, lores, eyelids, and other visible skin about the head were rich orange yellow. The iris was light buff and the inside of the mouth was yellow. The hawk had a rapid, direct, but rather disjointed flight, superficially resembling that of *Trogon m. massena*. Its stomach contained the grosbeak fledgling as well as a large female cockroach and a cricket.

I left the dead fledgling in the nest, hoping thereby to lure the parents back within gunshot. Two days later, on July 8, I was successful in collecting the male. At that time both birds were in the vicinity. The hawk and the male grosbeak are now in the collection of the Academy of Natural Sciences of Philadelphia.

Strangely enough this nest and one other among seventeen which I found in the Chiriqui region were the only ones which were molested by any marauder besides myself. I did not study all of these nests throughout the periods of incubation and fledging, but I was impressed by the low incidence of predation upon them. This suggestion of a low mortality among eggs and fledglings at Chiriqui needs further corroboration before it can be accepted as an ecological truth. Various residents in the region regard the common Green Toucan, *Aulacorhynchus caerulogularis maxillaris*, as an extremely voracious seeker of eggs and young birds and the worst enemy of small passerine species. It will destroy nests wherever it finds them, and is very bold coming right into the vines growing against the sides of houses.

The other nest which failed was that of *Brachyspiza capensis costaricensis*. It was situated six inches from the ground in a blackberry bush in a garden at 5000 feet elevation near Boquete, Chiriqui, and its two fledglings were destroyed, presumably, by a rat.

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THE TYPE OF *EMPIDONAX WRIGHTII* BAIRD

BY ALLAN R. PHILLIPS

IN the course of some ornithological investigations at the United States National Museum, I examined the type of *Empidonax wrightii*. As a result, I became convinced that it represents the species currently known as *Empidonax griseus* and not the species that now passes under the name *wrighti*. This specimen, no. 7234 of the National Museum bird collection, was taken by Charles Wright at El Paso, Texas, where it was, of course, only a transient. No sex is indicated on the label, but its measurements indicate a small male or a female, probably the former. Notwithstanding the fact that its colors are brown with age, comparisons made at that time (November, 1937) by both Dr. Harry C. Oberholser and myself showed it to be indeed, in aggregate characters, a Gray Flycatcher. Dr. Oberholser has recently gone over the whole matter again and has reached the same conclusion. Furthermore, he assures me that this specimen, marked as the type, is unquestionably to be considered as such.

The name *E[mpidonax] wrightii* was provisionally proposed by Baird (Report Expl. and Surv. RR. Pacific, 9: 200 [in text], 1858) as a substitute for *Tyrannula obscura* Swainson, in case the latter should prove not to apply to the bird that Baird had in hand. Swainson's name is now generally regarded as unidentifiable, and Baird's has been universally applied to another species, long thought to be the only one of these two species occurring north or east of Arizona, and which has accordingly been known as *Empidonax wrighti*. Since, however, the name *wrightii* proves to apply to the bird subsequently described as *Empidonax griseus* Brewster ('Descriptions of supposed new birds from Western North America and Mexico', p. 87, Jan. 31, 1889 [= separate from 'The Auk,' 6: 87, Apr. 1889]), the Gray Flycatcher must be called *Empidonax wrighti* Baird. The bird currently known as Wright's Flycatcher, now without a technical name, may be called

Empidonax oberholseri nom. nov.

Empidonax wrighti auct., nec Baird.

Type.—Adult male, no. 342070, U. S. National Museum, Biological Survey collection; Hart Prairie, San Francisco Mountain, Arizona, June 13, 1938; A. R. Phillips, orig. no. 352.

Specific characters.—Similar to *E. wrighti* Baird (= *griseus* Brewster), but tail longer; wing averaging shorter; upper parts, especially the crown, darker and more olivaceous (less grayish); bill less attenuated (relatively broader), the mandible often wholly dark brownish; outer tail-feather with outer web darker, less whitish, and thus less strongly contrasted with inner web.

Range.—Breeds in Transition and Canadian Zones of western North America, from Yukon, British Columbia, and western Alberta to southwestern California,

central Arizona (White and San Francisco Mts.), and north-central New Mexico. Winters from northern Mexico to Guatemala.

Remarks.—It gives me great pleasure to dedicate this species to Dr. Oberholser, whose unfailing assistance has made possible the preparation of this note. The necessity of shifting additional names in this troublesome genus is to be regretted. I believe, however, that the confusion can be minimized by retaining, at least temporarily, the current common names. I would therefore suggest that these two species now stand as:

Empidonax oberholseri. Wright's Flycatcher.
Empidonax wrighti. Gray Flycatcher.

For the use of specimens for comparison I am greatly indebted to the authorities of the U. S. National Museum and of the Biological Survey, and especially to Dr. Herbert Friedmann and Dr. Oberholser.

Museum of Northern Arizona
Flagstaff, Arizona

THE ARIZONA BROAD-BILLED HUMMINGBIRD[1]

BY ROBERT T. MOORE

WHEN *Cynanthus latirostris propinquus* was described (Proc. Biol. Soc. Washington, 52: 57–60, April 27, 1939), I expressed the belief that the birds from southwestern United States are approximately the same size as the birds of northwestern Mexico and of the same coloration. Since that time, thanks to the courtesy of George Willett and the Los Angeles Museum, a much larger series has been examined and confirms this belief. With the specimens which I collected in Arizona several years ago, I have compared twenty adults, comprising thirteen males and seven females, as well as several juveniles, all of them taken in southern Arizona and extreme northern Sonora, Mexico. Two males and four females from Saric were collected only eighteen miles from the United States border, not far from Nogales, Arizona, and are identical with birds of Ft. Lowell of the Tucson region. As a matter of fact, the Arizona birds resemble almost precisely a series of eighteen males and thirteen females in the Moore and Dickey Collections, taken from representative points all over Sonora, and also with seventeen males and twenty-one females in the Moore Collection from Sinaloa. There is not the least difference in coloration, and only a very slight tendency toward larger size in the birds of northern Sonora and Arizona. As will be seen by reference to the table of measurements, even this slight increase leaves the Arizona bird closer to *Cynanthus latirostris magicus* (Mulsant and Verreaux) of Sinaloa. Like *magicus*, it has definitely whiter under tail-coverts and darker green posterior under parts, as compared with the gray abdomens, only partially suffused with lighter green of typical *Cynanthus latirostris* of the Valley of Mexico. Furthermore, the Arizona bird is separated from true *latirostris* by the range of *propinquus*, a blue-bellied bird darker than either, which occupies the high plateau of Guanajuato.

In regard to nomenclature (*loc. cit.*) only the name *Hylocharis magica* needs to be considered. The Arizona bird should, therefore, be known as *Cynanthus latirostris magicus* (Mulsant and Verreaux). Its range extends from Arizona south on both sides of the Sierra Madre of northwestern Mexico, on the western side through the States of Sonora, Sinaloa, and Nayarit, probably to Colima and Guerrero; on the eastern side through Chihuahua to Durango. From all these States, with the exception of Colima and Guerrero, the Moore Collection has specimens which are identical with a typical series from near the type locality at Mazatlan, Sinaloa. It is worth noting that in spite of our exceedingly large series from Sinaloa, not one specimen

[1] Contribution from the California Institute of Technology, Pasadena, California.

has actually come from the type locality, and it is possible it may not frequent the gardens of Mazatlan, which is built out on a point extending into the Gulf of Lower California. In fact, it does not seem to be common on the coast of Sinaloa, for our nearest coastal station where it has been taken, is El Molino, one hundred and fifty miles to the north of Mazatlan. However, we have secured it at Rosario, thirty-seven miles southeast of Mazatlan and only ten miles from the coast. It is quite probable that the type came from the foothills a few miles east of this city. The majority of our specimens have been obtained at altitudes from 500 to 10,000 feet.

AVERAGE MEASUREMENTS OF *Cynanthus latirostris magicus* AND *C. l. latirostris*

	Wing[1]	*Tail*	*Exposed Culmen*
Males			
8 adults *latirostris*, Valley of Mexico	54.8	33.0	21.1
28 adults *magicus*, Sinaloa and S. Sonora	49.6	29.8	19.6
13 adults *magicus*, Arizona and extreme northern Sonora	51.0	30.8	20.0
Females			
2 adults *latirostris*, Valley of Mexico	53.2	31.1	21.3
19 adults *magicus*, Sinaloa and S. Sonora	47.9	27.5	20.1
7 adults *magicus*, Arizona and northern Sonora	49.9	28.4	21.6

My first acquaintance with the Broad-billed Hummingbird was made at the base of the great butte at Peña Blanca Spring, southern Arizona. A large group of *ocatillos* fringed the eastern ledges below the cliff, their red pennants proving an irresistible attraction. The birds did not seem to be interested in any other flowers and, although this species probably frequents other conspicuous colors, a six-years' observation of their habits indicates that red, or red-and-yellow flowers have been the ones that lured them. Mr. W. W. Brown writes me that in eastern Mexico, *Cynanthus latirostris latirostris* was particularly fond of a blue flower. A better knowledge of the habits of this hummingbird has been acquired in the States of Sonora, Sinaloa and Chihuahua of northwestern Mexico since 1932.

The finding of my first nest at the Guirocoba Ranch, Sonora, was a welcome goad to a brain completely fagged by the terrific heat. The tropical sun was desiccating a tiny arroyo with relentless power. The unearthly stillness and the buzzing in my ears gave queer thoughts of an earthquake or miracle to come. It came! But it did not come in the form of earthquake or wind. Instead, a glittering spirit seemingly from another world darted into our dry wash, and with its tiny bit of iridescent blue-and-green fire brought a spiritual quickening to a dulled mind, overpowered by torrid heat. Later a female propelled its tiny atom of a body straight to a nest on

[1] Wing measured from anterior point of metacarpus.

the branch of a small tree, overhanging the bank of the arroyo and not five feet from the ground. It was an unusual demonstration of courage and confidence in human beings, for the nest on May 2, 1934, contained no eggs, being only half finished. I have known many Ruby-throated Hummingbirds to desert an unfinished home, if one climbed the nest-tree, and never in my experience with some dozen of them has a single male or female protected an egg-less nest, as this tiny parent did repeatedly during the next few days. It is true that her little majesty was never really rude about it, for when I set up my camera without camouflage, this bit of animated lightning betrayed no resentment, flew straight to the nest, twirled about on it two or three times and showed no irritation because of the huge eye of the graflex! Curiously enough, the only time she really attacked was when I photographed her with moving-picture camera twenty yards from the nest, as she fed from the scarlet flowers of the *tavachin*. A formal visit to her home seemed perfectly proper, but an intrusion at the dinner hour was the epitome of rudeness. Even then, the attack was only half-hearted and chronic good nature took possession immediately, as she whirled from one brilliant flower to another.

A small shrub, the *tavachin*, flaunts an extraordinary flower, resembling the royal poinciana, and fairly startles one with its scarlet glory. Belonging to the genus *Caesalpinia* or *Poinciana*, it provided the favorite rendezvous for *Cynanthus*, as well as many species of butterflies. The tiny homesteader made many excursions to obtain insects from this plant, whose vivid red-and-yellow flowers flamed in the sunlit spaces across the sandy arroyo. She apportioned part of her time to the yellow flowers of a huge *opuntia*, which hung out perilously over her side of the arroyo. During the hottest period of the day, she drowsed on a branch of the nesting tree, within ten feet of the nest, not usually making food-rounds until 3.30 in the afternoon. After each round she would spend several minutes resting in the nest-tree. I timed the average of inception at the beginning of each circuit, which was approximately fifteen minutes, and each time she visited every flower over again. A few less conspicuous blooms of other species were also probed.

A male Broad-bill was observed feeding from the *tavachin* and, although he several times flew within ten feet of the nest-tree, he never landed on it, nor did the female appear to object to his feeding twenty feet away across the sandy wash. The Broad-bill is a common bird of the region and the male might not have been the 'mate'. Although the males of United States hummingbirds do not make a practice of assisting about the nest, southern species often do. In Ecuador I have observed the male and female Violet-ear take turns incubating at the same nest and collected both sexes to substantiate this observation. I doubt if the Broad-bill male assists in incubation. Such evidences of anger as the female exhibited, were directed

not so much at me as at the large blue swallowtail, which insisted on appropriating the sweets from her flower garden. Several times she, as well as the male, chased it away, but did not attempt to pursue the smaller butterflies. The flight of this bird from flower to flower is so characteristic that it can be recognized at some distance. Instead of darting straight to its object, as many hummingbirds do, *Cynanthus* progresses with a somewhat jerky, irregular flight. At least its short flight has an exceedingly nervous kind of movement, the tail bobbing up and down, lacking the precision of the Rivoli's undeviating course.

When it came to the more arduous operation of nest-building, involving the carrying of material and weaving instead of resting, she preferred the cooler hours of the day from 3.30 p.m. until dark, and did a prodigious amount of work. A red-letter day of accomplishment was May 2! At 5.30 p.m., the nest had attained one-half its final height, but at 9 o'clock the next morning, the complete altitude of the walls had been erected. As the nest, now before me, is approximately one inch high on the outside, the above statement means that the bird built a half-inch of wall material during the late afternoon and early morning hours! In addition, she added the lining and attached a considerable number of white cobweb strands, completely swathing the bottom of the nest with them and supporting and connecting its outer rim to the leaves and tiny branchlets in the vicinity. However, free access to the nest was not obstructed.

The most interesting nest-building technique was displayed a number of times when I was within a few feet of the nest. The bird moulded the bottom of it with quivering, caressing motions of the body. Often in the process, the wings revolved at almost full velocity, certainly until they were blurred to sight, and yet the body of the bird appeared to be sitting in the nest throughout the action. I saw this maneuver performed a number of times; sometimes it gave the impression of a swaying motion from one side to the other, without the body leaving the nest or the wings ceasing to revolve. When the wings did not revolve, the bill moved rapidly along the outside of the abode, tucking in protruding ends of grasses. The bulk of the nest is composed of exceedingly fine material, mostly tiny shreds of buff-colored or brownish bark, grasses and bits of dried leaves. The only larger pieces are three strips of bark placed upright, parallel with the tiny twig on which the nest is placed. I imagine these come from the *sabina*, a species of cypress, which grows to a great height along a small stream not far away. Part of the inside of the nest is lined with a white material, either some kind of minute plant down or cotton of fine texture. All these materials could be obtained from the fields nearby, which are cultivated by the Indians of the Guirocoba plantation.

Three other nests have been secured by our expeditions in Sinaloa, two

of them in March at Culiacan, and one on January 16, 1936, at San Lorenzo, Sinaloa. Examination of the sex organs of our numerous specimens proves that the birds are apt to breed at any time from January to August. As these last three nests contain two eggs each, it can be presumed that they are finished creations, although some hummingbirds attach ornamental bits of lichen to the exterior even during the period of incubation. Not the slightest indication of this appears in any of these four nests. The January nest was taken at San Lorenzo by Chester C. Lamb, and differs somewhat from the three others. Like the March 1 nest, it was attached to the stalk of a vine. Placed four feet up where the vine climbed over an *espino* tree, the body of the nest is composed almost entirely of cotton, but lined with a glossy white plant down. The base is supported by a dried pod of the vine itself. On the outside are attached pieces of dried leaves and, according to Mr. Lamb, some "short fibers of the Palo Blanco pods." The entire exterior is bound together with spiderwebs. The March 1 and March 7 nests from Culiacan display a lining of white plant down, covered on the periphery with bits of bark and leaves, but the bodies of the nests seem to be made of grasses and exceedingly fine thread-like stalks of dried plants. The March 1 nest was placed in a "dry bush, covered with dry vines," and the March 7 in an *espinosa* tree. In spite of these minor differences, these abodes are so similar that I think I could recognize one at random among a large number of other hummingbird nests. They all have some grass stalks in the body, are lined with white plant down, are adorned with bits of leaves and bark on the outside and not one of them has a single lichen on any part of the nest. In addition, they are all very small with an inside diameter of only about three-quarters of an inch, and all were placed within five feet of the ground. They differ markedly from our nests of other hummingbirds of Sinaloa, such as the White-ear, Azure-crown, and the Violaceous, all of which have lichen adornments.

The eggs are white, two in number, and at least in the case of the San Lorenzo nest, were laid two days apart. They measure as follows: San Lorenzo, January 16, 1936, 12.2 x 8.3 and 12.5 x 8.4; Culiacan, March 1, 1936, 12.1 x 7.9 and 12.8 x 8.1; Culiacan, March 7, 1936, 11.5 x 7.5 and 11.9 x 7.8 mm.

Our four nests have been found at altitudes from forty-five feet at Culiacan, Sinaloa, to 1450 feet at Guirocoba, Sonora. Specimens have been collected at the highest elevations, Palos Verdes Mines, 4900 feet, and taken by myself on the Urique River, Chihuahua, 5000 feet, and even on Mt. Mohinora at nearly 10,000 feet, but no nests have been secured at these altitudes. Although I observed both sexes repeatedly during May on Mohinora, feeding within a few feet of me among the flowers in mammoth beds of paint-brush, they showed no indications of breeding. In Arizona

the nest has been recorded as being found at a high elevation in the Santa Catalina Mountains by Harry S. Swarth (Condor, 12: 109).

The Moore Collection contains no young actually taken from a nest, but a young male, obviously not long out of the nest, was secured at the Guirocoba Ranch in extreme southeastern Sonora on March 26, 1931. The bill is only half the length of the adult's, the tail the same and the wings two-thirds. The postnatal molt is about four-fifths complete, e.g., on wings, tail, entire upper parts, under tail-coverts and portions of the neck. Possessing very loose margins, the remiges are recurved. Two nearly parallel feather tracts on the throat are sharply defined, because the new feathers are still in their sheaths, and areas on throat and breast are bare. As to coloration, it is significant that the tail plainly shows the male characteristics, being almost identically like the fully adult male tail in miniature, revealing no white tips to the lateral rectrices as in the female and having the median pair blue, tipped with gray, instead of entirely bronzy green. The longest upper tail-coverts show full development and might easily be mistaken for the median pair of rectrices. Therefore, it is clear that the sexes can be differentiated in this species, even in the juvenal plumage, when a few weeks old. 'Cinnamon buff' covers a large part of crown and occiput and reveals much wider margins on the back, than in the May, June and September worn juvenal plumage. The lesser and middle wing-coverts show iridescent green, instead of bronzy. On the under tail-coverts, although the plumage is looser than in the first-winter plumage, the general appearance is immaculate white, as in practically all adult *magicus*, contrasting sharply with *Cynanthus latirostris latirostris*. So many spots on the under parts are not feathered that, except for the under tail-coverts, they are blotched with black and light buff. The most interesting peculiarity consists in a prominent white post-ocular streak. This is represented by a narrower streak, half the length, in the adult female and juvenile male in first-winter plumage, and is reduced to a dot or is obsolete in the adult male. This streak consists of non-pennaceous feathers, very loose in texture, as in the juvenile male, and contrasts with the typical feathers of the adult female.

Five representatives of juvenile males in their first-winter plumage, form part of the Moore Collection. They resemble the female in coloration, except that the feathers of the upper parts are margined by buffy, much more narrowly than in the juvenal plumage, and the rectrices are exactly like those of the adult males. A female from Los Leones, Sinaloa, March 22, 1934, which has acquired the complete juvenal plumage, has feathers of upper parts margined just as broadly with 'cinnamon buff,' as in the young male in partial juvenal plumage, but differs in having a fully developed tail, just like the adult females. Consequently, the differences of the sexes can be determined in every plumage.

My acknowledgements are made to Mrs. Donald R. Dickey and Mr. Aadrian van Rossem for the privilege of examining specimens in the Dickey Collection.

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Pasadena, California

BIRDS OF THE MOUNT TRUMBULL REGION, ARIZONA

BY LAURENCE M. HUEY

PERHAPS the least-known part of Arizona from an ornithological standpoint lies north of the Colorado River in the extreme northwestern section of the State. This area, known as the Mount Trumbull region, includes the Dixie National Forest and the western part of the Grand Canyon National Monument. Historically, the section is rich in the lore of pioneers. It was here that the early Mormon settlers cut timber to build the town of Saint George, Utah, seventy miles to the northward in the Virgin River Valley. This valley, owing to its warm climate, was known as Utah's Dixieland, which explains the origin of the name Dixie National Forest. It was but a few miles west of this forested region, too, that the three deserters from Major Powell's celebrated exploration party met their tragic end at the hands of savages, in 1869. Yet in spite of this historic background, the literature of Arizona ornithology apparently contains not a single reference to the birds of the Mount Trumbull region. It was therefore a pleasant opportunity for the writer when he spent the period of July 24 to August 5, 1937, in that section.

The Mount Trumbull region is one of several plateaus that border the Colorado River along the east-to-west portion of its course. Mount Trumbull, Mount Logan and Mount Emma, all three rounded in outline, are the conspicuous peaks of this rather small area. The higher elevations of the plateau are covered with an open stand of western yellow pine, while pinyon and juniper abound on the lower levels. Eastward, the region is bounded by Toroweap valley, a semi-arid valley that reaches from the Colorado River northward to the Arizona boundary. On the north and west, vast grassy plains stretch for miles, broken here and there by low sage-covered hills on whose north slopes are found scattered juniper and pinyon trees; while toward the south lies the mighty chasm of the westernmost part of the Grand Canyon of the Colorado River. The area visited is all within the Transition Zone, though on the higher northern slopes of Mount Trumbull some locust and aspen were found, indicating a tendency toward Boreal. The whole region was ideally illustrative of the influence of climate on vegetation, with the pinyons and junipers reaching up through the pine forests where slope exposure or warm canyon drafts provided conditions favorable to their growth. As in other areas that border the Great Basin which lies to the northward, most of the alluvial soil of the flats and valleys was covered with a dense growth of sagebrush, while in some of the more sheltered canyons large thickets of scrub oak, mountain mahogany and service berries were found. At the time of our visit, the service berries were

ripening and were a great attraction to fruit-eating birds. The unspoiled wildness of the region was an added attraction, for, aside from a limited amount of lumbering and a few bands of sheep and cattle, there was little evidence of the devastating activities of man. The roads were dry-weather trails and visitors were rare.

On our way into the Mount Trumbull region, we camped for two days in an area of scattered pinyon and junipers at a point four miles north of Wolf Hole, which is located about thirty miles due south of Saint George, Washington County, Utah, and some twenty miles within the State of Arizona. At this camp a number of interesting birds were found, and mention will be made of this locality when species observed at this camp are listed in the text that follows.

Co-workers with the writer for the San Diego Society of Natural History on the trip were Leroy Arnold, Norris Bloomfield and Richard Neil, and added enjoyment was derived from the companionship of Major E. A. Goldman and Luther G. Goldman of the U. S. Biological Survey, and A. A. Nichol of the University of Arizona, who spent several pleasant days with us in the camps at Wolf Hole and Nixon Spring near Mount Trumbull.

WESTERN COOPER'S HAWK, *Accipiter cooperii mexicanus*.—On August 1, a Cooper's Hawk whizzed past within a foot of my head, as I was bent over the stove preparing breakfast at Nixon Spring. The bird was in its swift-darting, hunting flight and was no doubt in quest of a Mourning Dove, since these birds at the time were abundant in the small trees about our camp.

WESTERN RED-TAILED HAWK, *Buteo borealis calurus*.—Red-tailed Hawks were seen at both of our camps and several were also observed along our route. This species was the most common hawk of the region.

GOLDEN EAGLE, *Aquila chrysaëtos canadensis*.—An eagle was seen flying over Nixon Spring during the afternoon of July 27.

DUCK HAWK, *Falco peregrinus anatum*.—A lone female Duck Hawk flew directly over my head at Nixon Spring on the evening of July 28. No doubt it was attracted by the hordes of Mourning Doves that assembled each evening to drink from the reservoir. The next morning, shortly after sunrise, I had two shots at the bird as it flew over in easy range, but missed.

EASTERN SPARROW HAWK, *Falco sparverius sparverius*.—A pair of Sparrow Hawks lived about some large dead-topped pines that bordered a small field of rye near Nixon Spring. They were seen there every time the place was visited.

SAGE HEN, *Centrocercus urophasianus*.—During the afternoon of July 29, while hunting about two miles west of Nixon Spring, Leroy Arnold flushed a Sage Hen from under a juniper, which was growing on a ridge near a large area covered with sagebrush. He was within twenty feet of the bird when it walked rather slowly from under the tree. This is, as far as I am aware, the first report of this species for Arizona. Repeated attempts to collect a specimen were made by all members of the party, but Arnold was the only person fortunate enough to see this bird.

KILLDEER, *Oxyechus vociferus vociferus*.—This ubiquitous bird was seen at Wolf Hole, at several points along the route and at Nixon Spring. In fact, wherever there was a pool of water or a cow-trough, the Killdeer was present.

SPOTTED SANDPIPER, *Actitis macularia*.—A single individual, still in the spotted nuptial plumage, was taken on the bank of the small reservoir at Nixon Spring on August 2.

BAND-TAILED PIGEON, *Columba fasciata fasciata*.—Numbers of Band-tailed Pigeons lived on the wooded slopes of Mount Trumbull and were seen by all members of our party, when they explored that section.

WESTERN MOURNING DOVE, *Zenaidura macroura marginella*.—Mourning Doves were by far the most abundant bird of the region about Nixon Spring. Great numbers came each evening to drink at the reservoir and doves could be found or heard cooing about the place during any daylight hour of our stay.

SCREECH OWL, *Otus asio*, subsp.—I was awakened during the night of August 3, when an automobile came into Nixon Spring. During this time I heard a Screech Owl trilling in the woods up the mountain slope from camp. As no specimen of this species was collected, the identity is unknown.

MONTANA HORNED OWL, *Bubo virginianus occidentalis*.—Horned Owls were heard almost every night of our stay, both at our camp at "four miles north of Wolf Hole" and at Nixon Spring. One immature specimen was collected July 30 at Nixon Spring. It is very grayish and dark dorsally and seems to belong to the race *occidentalis*, rather than to the desert race *pallescens*.

WESTERN BURROWING OWL, *Speotyto cunicularia hypugaea*.—Two birds of this species were seen perched on fence posts along our route between Wolf Hole and Mount Trumbull post-office.

NUTTALL'S POOR-WILL, *Phalaenoptilus nuttalli nuttalli*.—On July 24, a pair of these birds was heard calling just after sunset near our camp "four miles north of Wolf Hole" and a male specimen was collected. The condition of the plumage about its face indicated that the bird had been feeding young.

PACIFIC NIGHTHAWK, *Chordeiles minor hesperis*.—Each evening during three nights spent at "four miles north of Wolf Hole" nighthawks were 'booming' over our camp in numbers. All were presumably of the *minor* group, since the single specimen taken proved to be of this race.

WHITE-THROATED SWIFT, *Aëronautes saxatilis saxatilis*.—The great cliffs of the western part of the Grand Canyon and Toroweap Wash, which are the summer homes of countless White-throated Swifts, were not far distant from Nixon Spring, and these birds came almost daily to feed over the forested region, where insect life was plentiful. White-throated Swifts were especially abundant during the afternoon of August 4, when a large number fed close to the surface of the small reservoir.

BROAD-TAILED HUMMINGBIRD, *Selasphorus platycercus platycercus*.—Hummingbirds were not common, though an occasional one was seen darting through the woods. The only specimen secured was taken at Nixon Spring on July 24 and proved to be of this species.

RED-SHAFTED FLICKER, *Colaptes cafer collaris*.—A immature male Red-shafted Flicker was collected from a family of seven at Nixon Spring on July 28. These birds had probably been reared nearby.

WHITE-BREASTED WOODPECKER, *Dryobates villosus leucothorectis.*—White-breasted Woodpeckers were not common. The two specimens collected were both taken in the yellow-pine forest near Nixon Spring.

CASSIN'S KINGBIRD, *Tyrannus vociferans.*—Cassin's Kingbirds were found at both our stopping places. Two specimens collected, one at each camp, proved to be both of this species.

ASH-THROATED FLYCATCHER, *Myiarchus cinerascens cinerascens.*—Several pairs of this species were found living in the junipers near our camp "four miles north of Wolf Hole," where they were breeding. A male specimen collected on July 25 was one of a pair that was still caring for their young which were fully grown and on the wing.

GRAY FLYCATCHER, *Empidonax griseus.*—The collecting of three immature specimens of the Gray Flycatcher in the neighborhood of Nixon Spring offers considerable evidence that the species breeds in this section of Arizona. However, until either a nest or birds too young to travel are taken, this status must remain questionable.

WESTERN FLYCATCHER, *Empidonax difficilis difficilis.*—A single female specimen of this species was collected at Nixon Spring on August 2. Its bare abdomen showed definitely that it had recently been incubating eggs.

OLIVE-SIDED FLYCATCHER, *Nuttallornis borealis borealis.*—The only Olive-sided Flycatcher seen was shot from the top of a small pine tree at Nixon Spring on August 1. Unfortunately the specimen was lost when it fell into a dense thicket on a side hill.

VIOLET-GREEN SWALLOW, *Tachycineta thalassina lepida.*—This swallow was abundant every day during our stay in the vicinity of Nixon Spring. The birds were attracted by the abundance of insects over the surface of a small reservoir of water. The presence of immatures gave evidence of their possible breeding in the pine forest earlier in the season.

PURPLE MARTIN, *Progne subis subis.*—A colony of about forty pairs of martins occupied two large dead pine trees near Nixon Spring and birds were seen every day during our stay.

LONG-CRESTED JAY, *Cyanocitta stelleri diademata.*—Long-crested Jays were not nearly as abundant as was the following species. Four specimens collected were definitely of the Rocky Mountain form.

WOODHOUSE'S JAY, *Aphelocoma californica woodhousei.*—This species was one of the more common birds of the region and was found in the pinyons and junipers near Wolf Hole and throughout the forested region about Mount Trumbull.

PINYON JAY, *Cyanocephalus cyanocephalus.*—Several flocks of Pinyon Jays ranged about the forests of the Mount Trumbull region. They were heard or seen by members of the party every day of our stay.

AMERICAN RAVEN, *Corvus corax sinuatus.*—Late in the afternoon of July 29, a few Ravens were seen straggling into the tall pines south of Nixon Spring. Toward evening a rather large congregation had assembled. The next morning, amid much cawing, small detachments were seen flying about or perched in the tops of the trees where they had roosted during the night. Suddenly, as if by prearrangement, they all took to the air. Forty-seven were counted as they left in a southeasterly direction.

This was the only observation made of this species at Nixon Spring, and gave the impression of a vagrant band moving over the countryside.

MOUNTAIN CHICKADEE, *Parus gambeli gambeli*.—Chickadees were found in small numbers in the yellow-pine association on the higher parts of the region about Mount Trumbull.

GRAY TITMOUSE, *Parus inornatus ridgwayi*.—Titmice were found sparingly in the scrub oak that was growing on the dryer slopes of the Mount Trumbull region.

ROCKY MOUNTAIN NUTHATCH, *Sitta carolinensis nelsoni*.—This large nuthatch was not common. It was found as often in the juniper association as it was in the yellow pines.

BLACK-EARED NUTHATCH, *Sitta pygmaea melanotis*.—This diminutive nuthatch was much more abundant than its larger relative, and companies of young on the wing were seen on nearly every excursion through the forest about Nixon Spring.

WESTERN MOCKINGBIRD, *Mimus polyglottos leucopterus*.—A pair of mockingbirds was seen on July 27 at a ranch called "Little Tank" near Diamond Butte, as we were en route to Nixon Spring.

SAGE THRASHER, *Oreoscoptes montanus*.—Sage Thrashers were seen in several places along the road between Wolf Hole and Mount Trumbull post-office.

CHESTNUT-BACKED BLUEBIRD, *Sialia mexicana bairdi*.—Bluebirds were common about the timbered region of Mount Trumbull. At the time of our visit, family parties were scattered all about and the spotted-breasted young were still being fed by their parents.

WESTERN GNATCATCHER, *Polioptila caerulea amoenissima*.—Western Gnatcatchers were found at both camps, "four miles north of Wolf Hole" and Nixon Spring. Birds of the year were taken at both localities.

GRAY VIREO, *Vireo vicinior*.—The song of this vireo was heard in the junipers near our camp "four miles north of Wolf Hole," and on July 25 a female was collected. Her bare abdomen gave proof of recent incubation and marked this bird as a breeding species for the juniper region.

PLUMBEOUS VIREO, *Vireo solitarius plumbeus*.—A single Plumbeous Vireo was collected on August 2 at Nixon Spring. Further collecting failed to reveal another bird of this species.

VIRGINIA'S WARBLER, *Vermivora virginiae*.—A single individual of this species was collected at Nixon Spring on August 2. It was an immature female and in all probability had been hatched in the region.

BLACK-THROATED GRAY WARBLER, *Dendroica nigrescens*.—Black-throated Gray Warblers were seen several times in the scrub oaks on the mountainside above Nixon Spring. Two specimens collected were both immature and were probably reared in the vicinity.

GRACE'S WARBLER, *Dendroica graciae graciae*.—On August 1, a pair of Grace's Warblers was found feeding a brood of three young out of the nest. The male and one young one were collected. They were in a dense growth of young yellow pines that bordered an open sage flat near Nixon Spring. On August 2, a second pair was seen feeding young in another section of the Mount Trumbull forest.

WESTERN TANAGER, *Piranga ludoviciana.*—A single immature male bird was taken at Nixon Spring on August 4. This bird proved to be the only Western Tanager seen or heard during our stay and it was probably a migrant.

ROCKY MOUNTAIN BLACK-HEADED GROSBEAK, *Hedymeles melanocephalus melanocephalus.*—On August 2, while we were exploring the north slope of Mount Logan, which lies some four miles south-by-west of Mount Trumbull, several thickets of service berries full of ripe fruit were found. Numbers of birds were feasting on these berries and among them were several Black-headed Grosbeaks.

NORTHERN PINE SISKIN, *Spinus pinus pinus.*—Three Pine Siskins were seen on a fence near the reservoir at Nixon Spring on July 29.

GRINNELL'S CROSSBILL, *Loxia curvirostra grinnelli.*—A small population of crossbills was found in the yellow-pine forest near Nixon Spring and three specimens were collected. Oddly enough, a mated pair taken on August 2 were in beautiful feather. The female of this pair was in laying condition, with an egg in her oviduct ready to be laid. The third specimen, a female taken August 3, was in the middle of the molt. Not only were the body feathers partly shed, but also those of the wings and tail.

SPURRED TOWHEE, *Pipilo maculatus montanus.*—Spurred Towhees were fairly common in the sage-yellow pine association about Mount Trumbull. Several families of young birds were found about the sage-covered glades that were interspersed in the yellow-pine forest.

WESTERN LARK SPARROW, *Chondestes grammacus strigatus.*—Numbers of Lark Sparrows were seen on the grassy plains that were traversed between Wolf Hole and Mount Trumbull.

DESERT SPARROW, *Amphispiza bilineata deserticola.*—Several pairs of Desert Sparrows were found near our camp "four miles north of Wolf Hole." A young bird in juvenal striped plumage was collected on July 25.

WESTERN CHIPPING SPARROW, *Spizella passerina arizonae.*—Chipping Sparrows were fairly common about Nixon Spring, where they came each day to drink. A young bird in striped immature plumage was collected.

San Diego Society of Natural History
San Diego, California

GENERAL NOTES

Atlantic Fulmar in Worcester, Massachusetts.—Early on the morning of December 29, 1938, Mr. Edward A. Browne, of this city, brought to the Museum of Natural History a live male Atlantic Fulmar (*Fulmarus g. glacialis*), in the light phase. The bird was mounted and is now on display at the Museum. The identification was subsequently checked by Dr. W. Elmer Ekblaw, who is familiar with the species from association with it in the Arctic. So far as can be discovered at the Museum, this is the first record of the species for Worcester County.—Harry C. Parker, *Worcester Museum of Natural History, Worcester, Massachusetts.*

Occurrence of certain birds of the Southern Ocean in the Tropical Atlantic.—During a voyage on the direct route from Cape Town to Dakar (Senegal), observations were made as to the northern limit of range of some of the species of birds which commonly follow ships. After leaving the Cape of Good Hope on September 9, 1937, the usual species were seen behind the ship daily in numbers until the evening of the 12th (noon reckoning: Lat. 21° 02′ S., Long. 6° 32′ E.). On the 13th, there were still four individuals of the Wandering Albatross (*Diomedea exulans*), all in the white-backed, brown-winged plumage, and at least a dozen each of the White-chinned Petrel (*Procellaria aequinoctialis*) and the Cape Pigeon (*Daption capense*). All of these were present until darkness (about 6.30 p.m.) made further observation impossible; at that time the ship was at Lat. 15° 0′ S., Long. 1° 20′ E.

On the 14th, the ship was still followed by three individuals of *Procellaria*, one of which turned away to follow a passing south-bound vessel during the afternoon. The remaining two were present until nightfall, when the ship had reached Lat. 10° 19′ S., Long. 1° 47′ W. The temperature of the air at 6.00 p.m. was 67° F.; the temperature of the sea 70° F.

Since, excepting three stragglers of *Procellaria*, all the southern birds disappeared between the evening of the 13th and the morning of the 14th, the meteorological and hydrological observations covering the period in question are of interest:

	Sept. 13, 1937	*Sept. 14, 1937*
Density at noon	1025	1025
Temperature of air at noon	65° F.	65° F.
Temperature of sea at 4.00 p. m.	64° F.	
Temperature of sea at 8.00 p. m.	65° F.	
Temperature of sea at 12.00 p. m.	64° F.	
Temperature of sea at 4.00 a. m.		67° F.
Temperature of sea at 8.00 a. m.		69° F.
Temperature of sea at 12.00 m.		70° F.

The presence of these birds in low latitudes in this part of the ocean may be explained by the southern winter and the influence of the cold Benguela Current, a stream deflected by the African continental mass from the eastward drift of the Southern Ocean. In the neighborhood where the birds were last seen, the temperature of the water is affected by the warm Guinea Current, which sets southward into the Gulf of Guinea from the north. The abrupt upward change in temperature during the night of September 13–14 is a result of leaving the sphere of influence of one current for that of the other.

Murphy ('Oceanic Birds of South America,' 1: 60, 1936), commenting at length on hydrology in relation to birds, observes: "Water temperature, rather than air temperature, may be said to govern the distribution of sea birds. The control is rarely a direct one between the warmth or coolness of the water and the sensory system of the bird. . . In most instances . . . the control is bound up rather with a long ecological sequence—with a ladder of phenomena beginning with sunlight and photosynthesis and ending in the nature and quantity of organisms upon which birds may feed."

Observations by several ornithologists on the occurrence of *Diomedea exulans* in these same waters (but without pertinent meteorological and hydrological data) have appeared in 'The Ibis.' Saunders (*l.c.*, 1866, p. 124) notes that "albatrosses range further north in the Eastern than in the Western Atlantic." Osmaston (*ibid.*, 1931, p. 98), from a north-bound boat at the end of the first week of October, observed that the albatrosses disappeared somewhere between Lat. 17° 12′ S. and Lat. 12° S. (*cf.* Lat. 15° 0′ S., *supra*, from a north-bound boat). Whistler (*ibid.*, p. 342), from a south-bound vessel, first met with it on the 18th of May, somewhere between Lat. 20° S. and Lat. 22° S. Ticehurst (*ibid.*, p. 344), on a south-bound ship, first saw it on the 19th of August, in Lat. 20° S. Finally, Moreau (*ibid.*, p. 781), also travelling southward, first recorded it early in October, in Lat. 20° S.

Lat. 20° S. would thus appear to be the normal limit for the species in the Benguela Current, and voyagers on *south-bound* boats need not expect to meet with it until an individual by chance sights the ship which has entered its domain. But a *north-bound* boat will induce following birds to travel north at least as far as whatever position is reached by the ship at the nightfall next after passing that limit (*cf.* Sperling, Ibis, 1872, p. 76).—H. G. Deignan, *U. S. National Museum, Washington, D. C.* (Published by permission of the Secretary of the Smithsonian Institution.)

White Pelican in Kentucky.—While studying shorebirds on the Falls of the Ohio River at Louisville, on September 5, 1938, I saw two White Pelicans (*Pelecanus erythrorhynchos*) flying downstream and almost directly overhead. As far as I have been able to ascertain this is the first record of this species in the Louisville area since the time of Audubon. While Miss Mabel Slack and I watched the majestic birds alternately flap their wings and soar in unison, they circled, apparently looking for a place in which to alight, and then descended behind a dike. We ran to the barrier, crept cautiously up the wall and from over the top saw them not a hundred feet from us. They were standing at the water's edge in company with a single American Egret (*Casmerodius albus egretta*) which had joined them soon after they had alighted. Seven-power and eight-power binoculars were used to observe the birds. Approximately twenty minutes elapsed from the time the pelicans were first seen until they became frightened and took wing. Instead of continuing their course downstream they headed up the river, then turned south and flew directly over the city of Louisville.—Dorothy Madden Hobson, *Louisville, Kentucky.*

Man-o'-war-birds prey on Eastern Sooty Terns.—J. B. Watson (Papers from Tortugas Lab. Carnegie Inst. Washington, 2: no. 103, p. 212, 1908) could find no evidence that Man-o'-war-birds (*Fregata magnificens rothschildi*) preyed upon immature Eastern Sooty Terns (*Sterna fuscata fuscata*) at the Dry Tortugas, Florida, in 1907. Paul Bartsch (Ann. Rept. Smithsonian Inst. for 1917, p. 469–500, 1919) mentioned active predation and others have seen it occur since. The writer visited Fort Jefferson National Monument at the Dry Tortugas several times during the spring and summer of 1938 and has seen Man-o'-war-birds capture Sooty Tern chicks upon numerous occasions.

At the time Watson made his studies, the Eastern Sooty Terns and Noddies (*Anous stolidus stolidus*) used Bird Key exclusively. It was then a small island well covered with bay cedars. When Bartsch was at the Tortugas, the terns still nested on Bird Key, but a hurricane had changed the vegetation and there were fewer bay cedars and more open areas. At the present time, the birds nest in colonies on the eastern portion of Garden Key and the northern and western parts of Bush Key. Bird Key has washed away.

Experiments by the writer with captured Man-o'-war-birds showed that the species is unable to fly among bushes. Individuals placed on the ground or released just a little above the ground between bay-cedar bushes were unable to take to the air unless there was at least an eight-foot clearance (their wing spread is seven feet) and often not even then unless the wind was blowing strongly in their faces. So, although Watson observed the big birds soaring low over the tern colonies, the immature Sooty Terns were probably protected by the bay cedars which grew on Bird Key at the time.

During the 1938 nesting season, there were estimated to be about 27,500 adult Eastern Sooty Terns on Garden Key and 36,570 on Bush Key (Beard, Fla. Naturalist, Oct. 1938). From twenty to sixty Man-o'-war-birds regularly soared over a corner of old Fort Jefferson on Garden Key where the updraft of air from prevailing southeasterly winds was deflected from the walls of the fort. Soon after sunrise in the mornings when the Man-o'-war-birds moved from their roost on Bush Key to position over the corner of the fort and in the evenings from six to seven o'clock before returning to the roost, the birds preyed upon Sooty Tern chicks.

A Man-o'-war-bird would swing away from the soaring group and gradually glide lower over the tern colonies on either Garden or Bush Keys, turning its head from one side to the other when near the ground. This reconnaissance flight took from five to fifteen minutes. About once out of ten times, the bird would return to position over the fort without taking any young terns. Usually, however, the Man-o'-war-bird would begin flapping its wings, break into a short glide, pick up an immature Sooty Tern in its beak without breaking the forward motion, and flap rapidly away. One or more Man-o'-war-birds would pursue the one carrying the tern chick. It often happened that, after some beautiful aërial acrobatics, the little tern would be released and another Man-o'-war-bird would scoop it out of the air before it hit the water. At one time, an unfortunate chick changed from one bird to another four times before being swallowed. After eating an immature Sooty Tern, the Man-o'-war-bird always swung down over the water and drank while in flight.

It is not possible to state exactly how long the immature Sooty Terns are vulnerable to attack because they do not hatch out at the same time in the colonies. However, it is believed that they are safe for the first few days after hatching when they lie flat in nesting depressions and after they are about a month old. Predation was noted only in open areas and not among bay cedars. The writer saw eighteen Sooty chicks taken in one evening, but workers at Fort Jefferson reported that the number was sometimes as high as thirty-three and forty. There is no evidence that Man-o'-war-birds will take Eastern Sooty Tern eggs or young Noddies. The Noddies nest in bushes, high grass, deep sea purslane, or other less exposed places and cannot be reached by the Man-o'-war-birds. It is also to be noted that the Noddy will not desert its young as quickly as does the Sooty Tern.

Observations were made of the colonial behavior of Sooty Terns when Man-o'-war-birds were preying upon the young. It was found that the immature Sooty Terns seemed totally oblivious to the large birds swinging over their heads. The Sooty

chicks were capable of moving from nesting territory and most of them spent the greater part of the day under the shade of bushes as much as fifty feet from their nests. They came out in the evenings when the heat of the sun was diminishing and stayed until it became hot again in the mornings. So, they were exposed in the open when the Man-o'-war-birds hunted them. Adult Eastern Sooty Terns became excited upon the approach of a Man-o'-war-bird and sometimes flew after it when a chick had been picked up; but at no time were they seen actually to attack the intruder. One Noddy was seen striking a Man-o'-war-bird on the back as it flew low near the Noddy's nest. The mate, however, remained on the nest protecting its young. Adult Sooty Terns resumed normal behavior less than a minute after a chick was taken. Even the parents of a captured bird alighted in their nesting territory after a few minutes and acted in a normal manner.

The writer has never seen a Man-o'-war-bird attack an adult Sooty or Noddy and force it to disgorge while on the wing.—Daniel B. Beard, *National Park Service, Washington, D. C.*

Reddish Egret nesting near Tavernier, Florida.—On April 17, 1938, I discovered the nest of a Reddish Egret (*Dichromanassa rufescens*) near Tavernier, Florida, in the Florida Keys district. The nest was located about six feet above the water, in a clump of red mangroves on a small key or island approximately eight miles west of Tavernier. No nests of other birds were observed on the little key which was only about two hundred feet across. The flat nest, about fourteen inches in diameter, composed principally of sticks, contained two young and one egg. One adult remained nearby during the period of observation, sufficiently close for positive identification as a Reddish Egret. The nest was photographed several days later independently by Mr. Alexander Sprunt, Jr., of Charleston, Director of the Southern Sanctuaries Section of the National Association of Audubon Societies. Apparently definite nesting records of Reddish Egrets in Florida have been rare in recent years.—Thomas C. Desmond, *94 Broadway, Newburgh, New York.*

Snow Goose at Reading, Pennsylvania.—On November 13, 1938, Conrad Roland and I saw a Snow Goose (probably *Chen hyperborea atlantica*) on Lake Ontelaunee, near Reading, Berks Co., Pennsylvania. The only other anserine birds present were Black Ducks, Mallards, and Green-winged Teal. It mingled with these, taking flight with them when we alarmed the flock. The birds finally retreated to a small estuary, where the goose followed several Black Ducks to a mud flat. When we last saw it, the bird was walking along the shore line, apparently feeding. Recent Pennsylvania records of the Snow Goose are rare. One was seen on November 8, 1934, on the Susquehanna River in Lancaster County (Auk, 52: 436), while four were seen on the Susquehanna at Harrisburg on November 18, 1935 (Auk, 53: 94 and 208). These are the only records I have been able to find for the present decade.—C. Brooke Worth, *Dept. of Zoölogy, Swarthmore College, Swarthmore, Pennsylvania.*

Barrow's Golden-eye in New Jersey.—On February 5, 1939, while observing waterfowl on Sandy Hook Bay from the beach-front of Leonardo, Messrs. C. D. Brown, J. L. Edwards and F. P. Wolfarth identified a fine drake Barrow's Golden-eye (*Glaucionetta islandica*). The duck was under observation for nearly twenty minutes and with the aid of a 35-power telescope, all field marks were carefully noted. The differently shaped head, glossed with purplish iridescence, the crescent-shaped face patch, the black sides marked with two plain oblong white patches and a row of white spots on the scapulars and the black curved line down the center of the side

were plainly seen by all observers.—Floyd P. Wolfarth, *East Rutherford, New Jersey.*

Short-tailed Hawk in Florida.—During the years of 1935–36–37 and part of 1938, the writer has had occasion to spend considerable time in field work in southern Florida. Trips have been made in almost every month with the exception of the summer season, and particular attention has been paid to the Everglades. The whole of this great area, from Lake Okeechobee to Cape Sable and from the east coast to the west, has been explored by all possible means of investigation. Several flights have been made by dirigible and amphibian plane; extensive surface work accomplished by means of automobile, on foot, by boats of various descriptions. The many rivers of the southwest coast (Ten Thousand Islands) have been explored; the Big Cypress worked; Cape Sable covered as well as the several lakes in that vicinity, and Whitewater Bay visited on several occasions. The Tamiami Trail has been crossed many times, and the area known as Pinecrest, lying on the so-called Loop of this Trail, has been investigated from the air and on the surface; many of the dense hammocks have been visited on foot. Royal Palm Park (Paradise Key), Long Pine Key and others of the larger wooded areas of the lower Everglades, have all been investigated.

Particular attention has been paid to those species which may be described as rare or unusual. Prominent among these are the Roseate Spoonbill, Flamingo and Cape Sable Sparrow, together with the Short-tailed hawk (*Buteo brachyurus*), the last always an item of attraction to any ornithologist visiting that region. This small *Buteo* occurs in the United States in Florida only, and is very locally distributed there. In recent years, it seems to have become even more uncommon than it once was, and at best, it could never have been described as more than 'occasional'. For excellent accounts of its range and habits, the reader is referred to 'Florida Bird Life' by Arthur H. Howell, page 179, and 'Life Histories of North American Birds of Prey' by Arthur C. Bent, page 254. It is the purpose of the writer simply to state his experience with the species as has been noted in field work described above.

This hawk has been observed on four occasions as follows:

(1) One bird (light phase) seen at Royal Palm Hammock, Tamiami Trail, Collier County, on February 25, 1935, observed at a height of about forty feet in bright sunlight.

(2) One bird (light phase) seen at Flamingo, Cape Sable, Monroe County, on March 12, 1937, perched on dead stub and allowed close approach.

(3) One bird (light phase) seen at Pinecrest, The Loop, Dade County, on January 18, 1938. Exact locality was at the site of the old hotel, about three miles west of the Y on the Tamiami Trail. Bird soared directly overhead in excellent light, and was watched for some minutes.

(4) One bird (dark phase) seen at Deep Lake Hammock, Big Cypress, Collier County, on January 20, 1938. This bird flushed from a nest as we walked under the tree, and was seen at close range. The noise occasioned by its leaving the nest which was placed in a cabbage palm, attracted attention, the wings of the bird clashing audibly amid the palmetto fans. It soared overhead in small circles and disappeared into the hammock to the northeast. It will be noted that the last two observations were made only two days apart, while the first two are separated by more than two years! In the later observations, the two localities are widely separated by some thirty-five or forty miles.

Two nests of this rare hawk have come under the writer's observation. The first

was discovered by Edward J. Reimann, of the Audubon Association's Southwest Coast Patrol, and shown to the writer March 16, 1937. It was built in a red mangrove (*Rhizophora mangle*) on the south shore of the upper reaches of Shark River, southwest coast. It was located about twenty-five feet up, and over the water, composed of mangrove sticks, lined with leaves (green) of myrtle, mangrove, stopper-wood and willow. It contained two eggs. This nest was broken up a day or two after by crows.

The other nest was discovered by the writer as above described. It was built in exactly the same manner as that employed by the Audubon's Caracara, being placed close to the trunk of a cabbage palm, and amid the tuft of fronds near the top of the tree. This is, by a considerable margin, the earliest known nesting date, most of the Florida nesting records having been made in March and April.

The writer knows of another nest discovered by James Earl Moore, of Miami, in late March 1937. It was located in Pinecrest, and was built in a very small cypress, hardly more than eight feet from the ground. Moore found the nest when it contained three eggs and watched it until the birds were hatched and left the nest.

I am told by Warden Reimann that he notes these hawks at intervals during the patrols made by the Southwest Coast Warden Patrol. They seem to be not excessively rare along the rivers which make in from the Gulf to the western Everglades. Such streams as Chatham, Broad, Lostman's, Rodgers and Shark Rivers have figured in his reports. He observed one bird on Marco Island during the taking of 'Bird-Lore's' Christmas Census for 1937. It is the opinion of the writer that this species is one of the rarest of birds in Florida and that this is shared by others is evidenced by Mr. Bent's comment in his account of the species in his 'Life Histories'. Never common, it seems to be steadily decreasing its range southward, and now is confined pretty much to the region south of the Tamiami Trail and the southwestern portions of the Everglades. Every effort should be put forth to preserve its present status, and to increase its numbers.—ALEXANDER SPRUNT, JR., *Charleston, South Carolina.*

Sora Rail breeding in Virginia.—As there appears to be no definite instance of the nesting of the Sora Rail (*Porzana carolina*) in Virginia, the following incident seems worthy of record. It was reported to the Biological Survey by Max D. Hart, Executive Secretary of the Commission of Game and Inland Fisheries. The observations were made by State Game Warden Jefferson C. Phillips, of Hampton, Virginia. On June 9, 1938, Mr. Phillips was cutting hay in a marshy section of a flying field at Langley Field when the boy operating the rake caught a young black bird, obviously a rail. A second one was found nearby, both of which Mr. Phillips put in his hat on the ground. Several adult Soras had already been noted during the progress of the cutting. About half an hour later Mr. Phillips noted that the young were still calling lustily, so he turned the hat over gently to allow them to escape. Much to his amazement an adult Sora was under the hat. As the adult bird did not move, after about half a minute he lifted it on a finger to see if it were injured, whereupon it flew about fifteen yards and alit again. As the downy young of all rails are black, it is possible, of course, that this incident merely represents the solicitude of a bird for young not its own, but circumstantially, it seems to be reasonably satisfactory evidence of the breeding of this species in tidewater areas of the Old Dominion.—FREDERICK C. LINCOLN, *U. S. Biological Survey, Washington, D. C.*

Florida Gallinule at Philadelphia in winter.—The Florida Gallinule (*Gallinula chloropus cachinnans*) has long been regarded as a summer resident in the Philadelphia region, the bird wintering from South Carolina southward. In the records of Richard

F. Miller, who has taken notes on his observations of birds in this locality for the past thirty-five years, he finds that the average date of fall departure is October 9 and that of spring arrival April 21.

During the past winter, I have found four birds of this species remaining with us at the Richmond Marshes, a tract within the city and situated along the Delaware River. The weather had not been too mild, and there were a number of freezes. However, the safety of these birds throughout the ice and snow was probably due to an influx of warm water through a culvert pipe, which kept open about one hundred square yards of water and cat-tails. I visited this locality on December 22, 1938, while working on a Christmas census report for the Philadelphia area. The marshes were frozen solid except for the small patch kept open by the warm water. At first, there seemed to be not a single sign of life; but, after remaining still for about five minutes, I was rewarded by a clucking sound. Right off, I believed I had a Coot; which appears to be the more hardy of the two cousins; but, a second later, a jerky head started out from behind a cat-tail clump and a gallinule burst out into the open. I clapped my hands to start the bird in order to see if it had been injured and robbed of its powers of flight. It seemed to be strong as it pattered across the water where it arose and flew to a dense cat-tail thicket. I remained quiet and saw one more individual come out from hiding. On January 5, 1939, I returned to the marsh, and this time saw four birds which took wing and flew to the middle when I flushed them. A record of crippled birds wintering would be the result of a forced issue upon them; but their stay must have been voluntary for all of them seemed possessed of their full powers of flight.

Heretofore, the only winter records of Mr. Miller for Philadelphia County had been one bird captured at Richmond, February 13, 1913; two birds seen at Richmond, November 9, 1927; and one bird at Richmond, November 7, 1932.—Edward J. Reimann, *2285 E. Kennedy St., Philadelphia, Pennsylvania.*

Lapwing at Bridgehampton, Long Island.—While pursuing a rough survey of the winter bird life of Long Island, New York, Messrs. Robert J. Newman and Millard Lindauer of the Miller Ornithological Club of Philadelphia discovered a mounted specimen of the Lapwing (*Vanellus vanellus*) in the home of Dr. Eagleston, of Bridgehampton. His father while hunting in that vicinity had observed that it appeared to be of an unusual kind and shot it. The present Dr. Eagleston states that this occurred sometime during the fall of the year 1910. He asserted that his father at the first shot only wounded it, but finally caught it. The 'German Plover,' as he called it, was mounted, and to this day, remains in the Eagleston household, in the possession of his son, the present Dr. Eagleston of Bridgehampton.

So far, there are only two published records of the occurrence of this species on Long Island: two birds in December, 1883 (Dutcher, Auk, 3: 438, 1888); and a single bird in the autumn of 1905 (C. W. Beebe, Auk, 6: 221, 1906).—Edward J. Reimann, *2285 E. Kennedy St., Philadelphia, Pennsylvania.*

Long-billed Curlew in Massachusetts.—On June 14, 1938, Mr. J. P. Bishop, of South Chatham, found one of these great curlew on the "Red River" salt marsh at Chatham. At 7.30 p.m. it showed every sign of bedding down for the night, so he very kindly telephoned me in Cambridge. Knowing him to be most reliable and careful, his account was the first one I had ever received from an observer without previous experience of the species in life, that made me certain his bird was in fact a Long-billed Curlew (*Numenius americanus*). I accordingly left Cambridge at daybreak, and reached Mr. Bishop's house some three hours later. The curlew was

located almost at once from a bluff overlooking the marsh. At a distance of nearly a quarter of a mile, only the pale head and great bill showed above the marsh grass, but this was ample for instant elimination of the Hudsonian Curlew, though not, of course, for a European Curlew.

Many misleading remarks about the identification of this curlew in life have been published in scientific manuals by ornithologists, whose lack of field experience or competence in the field are patent. They chiefly tend to stress the greater size and greater length of bill, but add the very proper proviso that a small Long-billed Curlew is no longer-billed than a large Hudsonian. Inexperienced bird observers consequently think they see an occasional Long-billed Curlew, because they are "sure" that the bird they saw was very much larger and longer-billed than the Hudsonian Curlew. In a region where the latter is a historic memory only, they naturally fail to produce a satisfactory record, chiefly because they did not know or note the characters that enable the experienced to recognize either species at practically the limit of vision in good light.

In the first place the Long-billed Curlew is in fact the largest of North American shorebirds. Entirely waiving the variable bill length, the body of a Long-billed Curlew is *almost twice as big* as that of a Hudsonian. To the experienced so great a difference is readily perceptible. Color characters are, however, even more definite. The Hudsonian is a dark-looking bird, a dingy grayish brown, with an even darker-appearing head, due to the five dusky stripes; in flight the under surface of the wing is buffy or grayish, obviously barred with dusky, and does not afford a color contrast with the rest of the under parts. In the Long-billed Curlew, on the other hand, the general color is light cinnamon, the *unstriped head appearing lighter* than the back. The general color effect is very pale and totally different from that of a Hudsonian; indeed, in good light it is perfectly apparent at a quarter of a mile. The under surface of the wing is a deep, bright cinnamon, in *very striking contrast* with the rest of the under parts; the barring, when present at all, is so sparse and narrow as to be practically invisible at long shotgun range.

To return to the bird at South Chatham, it was collected after an hour's stalk and proved to be a female with undeveloped ovaries, that had failed to complete the spring molt. This probably accounts for the abnormal and unprecedented date of occurrence. The specimen is now mounted in the New England Museum of Natural History. I repeat once more that this record was Mr. Bishop's discovery and here express my indebtedness to him for letting me share it. It gives me the pleasant opportunity of introducing Mr. Bishop to readers of 'The Auk'. Fortunately for New England ornithology, we now have an active student resident on the tip of Cape Cod, one of the most interesting stations for observation in the northeastern States.—Ludlow Griscom, *Museum of Comparative Zoology, Cambridge, Massachusetts.*

A Curlew new to North America.—Among the specimens received from Charles D. Brower, representative of The Colorado Museum of Natural History, this past fall, was an old-world curlew, *Numenius phaeopus variegatus*. The specimen, an adult male (C. M. N. H. no. 19454), was taken at Barrow, Alaska, June 10, 1938. It was submitted to James L. Peters, of the Museum of Comparative Zoology, for final subspecific determination and he writes as follows: "The curlew is, beyond the slightest doubt, referable to *Numenius phaeopus variegatus* (Scopoli), the breeding form of northeastern Siberia. So far as I know, it is a new North American record. It is the form referred to on page 112 of the A. O. U. Check-list, 4th ed., under *Phaeopus phaeopus phaeopus*, where it says 'a closely allied race occurs in eastern

Asia.' There seems to be no limit to the unexpected things that Brower turns up at Point Barrow!"

It will be noted that Mr. Peters uses *Numenius;* I agree with him that the genus *Phaeopus* appears an unnecessary split.—ALFRED M. BAILEY, *The Colorado Museum of Natural History, Denver, Colorado.*

Western Sandpiper in Illinois.—On August 14, 1938, during banding operations at Chicago Ridge (southwest of Chicago), Cook County, Illinois, a single sandpiper, trapped from a group of Semipalmated Sandpipers (*Ereunetes pusillus*) and given band 38-20312, was noticed to be decidedly different from the others, particularly in size, lighter coloration of under parts, and length of bill. This proved to be a Western Sandpiper (*Ereunetes mauri*). The identification was made jointly by Mrs. Amy G. Baldwin and Mr. Harold O. Wiles, both of Chicago, and Mr. Bartel. It was slightly but noticeably larger than the 'Semipals'; its bill, thicker at the base, was longer than its head; there was a greater amount of reddish on the feathers of the back (particularly scapulars) and nape; and the breast was plain white except for lines of very faint dots. Measurements taken in the field are: bill, 1.03 inches; wing, 3.94 inches; and length, 6.25 inches.

Ford, Sanborn, and Coursen's 'Birds of the Chicago Region' (1934) lists but one definite record—that of a male taken at Hyde Lake, Cook County, on May 19, 1928. That this is a *spring* record from the interior is of particular interest since Bent states that none was contributed for his 'Life Histories of North American Shore Birds' (1927); furthermore, Widmann (Trans. Acad. Science St. Louis, 17: 70, 1907) states that the species "has been taken a few times in spring on sandbars in the Mississippi River by Mr. Chas. K. Worthen of Warsaw, Ill.," and DuMont (Univ. of Iowa Studies Nat. Hist., 15: 72, 1934) adds that "in eastern South Dakota, it has been collected in April." No data are available on a second extant Chicago-region specimen in the collection of S. S. Gregory; and efforts have been made to locate Worthen's specimens, mentioned above, but without success.

In the Chicago region, this species retains its classification as a very rare transient in spring; but it appears to be uncommon though regular during the fall, and as for the lack of skins to support this, as Bent (1927) states, "undoubtedly it has been generally overlooked on account of its close resemblance to the Semipalmated Sandpiper, an abundant species which few collectors bother to shoot." Field Museum records of Chicago-region field observations contain a dozen fall records for 1936–38, the extremes being August 13 (Palmquist) and September 3 (Dreuth). The species has been reported by more than a half dozen of the most active field ornithologists of the region, one of whom, Mr. William Dreuth of Chicago, has observed it at Lincoln Park at least once each fall since 1932, except 1935 (Audubon Annual Bull., Illinois Aud. Soc., no. 28, p. 37, 1938).

Several unpublished sight records from various parts of the State have been kindly contributed for inclusion in the present note. Arthur S. Hawkins and Frank C. Bellrose of the Illinois State Natural History Survey report four or five Western Sandpipers among Least and Semipalmated Sandpipers at Flat Lake, Calhoun County, on July 14, 1938; another individual was seen among Semipalmated Sandpipers at Douglas Lake, Chillicothe, Peoria County, on August 28, 1938. Richard Allyn has observed the species once at Jacksonville, Morgan County, on September 4, 1935 (one individual), and again at Lake Springfield, Sangamon County, on September 17, 1938 (three individuals).

Ridgway ('Ornithology of Illinois,' Nat. Hist. Surv. Illinois, 2: 54, 1895) classified

the species as "not uncommon during the migrations, usually mixed in flocks of *E. pusillus*, but sometimes in small companies by itself." There seems to be little doubt that while more recent publications have taken exception to this statement for lack of supporting evidence, directed effort and more field observation would probably support it as valid.—KARL E. BARTEL, *Blue Island, and* FRANK A. PITELKA, *Lyons, Illinois.*

Passenger Pigeons recorded by Pike in 1806.—There is an interesting account of the nesting of Passenger Pigeons (*Ectopistes migratorius*) in the journal of Zebulon Montgomery Pike ('Exploratory Travels through the Western Territories of North America,' 1811). Inasmuch as this account is not included in Mr. A. C. Bent's life history of this extinct bird (Bull. U. S. Nat. Mus., no. 162), it may be worth while to republish Pike's notes. While descending the Mississippi River, in 1806, he wrote under date of Monday, April 28: "About ten miles above Salt River we stopped at some islands where there were pigeon roosts, and in about fifteen minutes my men knocked on the head, and brought on board, about three hundred. I had frequently heard of the fecundity of this bird, but never gave credit to what I then thought to approach the marvellous; but really the most fervid imagination cannot conceive their numbers. Their noise in the woods was like the continued roaring of the wind, and the ground may be said to have been absolutely covered with their excrement. The young ones which we killed were nearly as large as the old; they could fly about ten steps, and were one mass of fat; their craws were filled with acorns and the wild pea. They were still reposing on their nests, which were merely small bunches of sticks joined, with which all the small trees were covered."

The Salt River is well above the junction of the Missouri and the Mississippi, and the location Pike gives would probably be a few miles below the site of the city of Hannibal, Missouri. Mr. Bent does not include Missouri among the States in which nesting colonies of pigeons occurred, and it would seem that State has a just claim to such a distinction.

Early writers gave very few specific nesting dates, so these notes from Pike's journal may be of value in that they give the day and month on which he visited the colony. April 28 seems surprisingly early for nesting Passenger Pigeons, and especially for the birds to have large young. Pike seemed to have had the ability of including a great deal of information in a few lines of copy; in the above notes he gave the specific dates of his observation, a rather definite location of the nesting colony, a good account of the great numbers of birds, information regarding the size, condition, and food of the young, and a description of the nests.—ALFRED M. BAILEY, *Colorado Museum of Natural History, Denver, Colorado.*

Smooth-billed Ani nesting in Florida.—In 'Florida Bird Life,' (p. 290) Arthur H. Howell says of the Smooth-billed Ani (*Crotophaga ani*), that "the ani is not known to breed in Florida, and little seems to be known of its habits there." Perusal of 'The Auk' since the publication of Howell's book (1932) has failed to throw additional light on the status of this species other than Semple's reference to a small flock which he took to be examples of *Crotophaga ani* at Miami Beach in February 1937 (Auk, 54: 391) in which no allusion was made to nesting. R. J. Longstreet noted birds at the Dry Tortugas also, but took no specimens. Therefore, it seems that the following is the first record of the actual breeding of this species in Florida and in the United States. I am indebted to my friend J. Earle Moore, of Miami, Florida, for the privilege of recording it.

This highly interesting occurrence took place in the yard of Mr. Charles Lange, at

32d Ave. and 19th St., N. W., Miami, Florida (Dade County). A pair of these birds was seen engaged in nest building there, and began building the "last of June" 1938. Eggs were in the nest on July 15, to the number of four. These hatched on August 9. The nest was placed in a 'toothache bush' between fifteen and eighteen feet from the ground. The young were brought to the stage of flight when one adult and one young were killed by marauding small boys. The three other young survived, as did the remaining adult. Mr. Lange had the dead adult and the young bird mounted, and they are (presumably) in his possession at this writing. His residence is just outside the city limits of Miami.—ALEXANDER SPRUNT, JR., *Nat'l Association Audubon Socs., Charleston, South Carolina.*

Burrowing Owl in the Lower Florida Keys.—In 'The Auk' (55: 532, 1938) the writer listed what are apparently the first records for the Burrowing Owl (*Speotyto* sp.) in the Florida keys. No specimens were secured, but diligent inquiry could reveal no former occurrence there. It was suggested that these birds might be the western form, coming over in winter to the Keys, as does the Scissor-tailed Flycatcher (*Muscivora forficata*) and the Reddish Egret (*Dichromanassa rufescens*). During this present winter of 1938–39 a sharp watch has been kept by the writer on his monthly trips to the Keys, for other specimens. On the night of December 11, 1938, in company with Messrs. E. M. Moore, Audubon representative in Key West, and Ellison A. Williams of Charleston, South Carolina, the writer saw a Burrowing Owl on Sugarloaf Key, eighteen miles east of Key West. It will be noted that this locality is in the Lower Keys, while the former records are all in the Upper Keys, from Matecumbe to Key Vaca. Hence, the occurrence of this bird was established in both Upper and Lower groups. Since determination of the identity of the form could not be accomplished without the specimen, it was secured on the night of the 12th, at the same spot. The skin was sent to Dr. Eugene E. Murphey, of Augusta, Georgia, and after comparison with his series, he writes me that he can come to no other conclusion than it is the Florida form (*Speotyto cunicularia floridana*). While this is not conclusive that the western form does not visit the Keys in winter, it reduces the possibility to a degree. At any rate, it is now certain that the Florida form does resort to the Keys, both Upper and Lower, in the winter months, and probably has done so formerly. That it has escaped the attention of ornithologists working in that area seems rather remarkable.—ALEXANDER SPRUNT, JR., *R. F. D. No. 1, Charleston, South Carolina.*

Unusual nesting site of the Chimney Swift.—When I was passing through the Mississagi Forest Reserve, seventy miles northeast of Sault Sainte Marie, Ontario, Canada, I found on August 11, 1938, a nest of the Chimney Swift (*Chaetura pelagica*) in a large sprinkler. Several birds flew from the interior as I climbed in and I nearly succeeded in catching an immature bird that was perched on the nest. The nest was in the darkest corner, fastened to the side within ten inches of the top. The sprinkler is little more than a water-tight box on four sled runners, the box measuring about fifteen feet long, eight feet wide and five feet high, and with all but a small portion of one end of the top boarded over. During the winter it is used to sprinkle water on the logging roads to ice the sled tracks. The sprinkler is moved from one locality to another each year as the logging operations progress and is left for the summer wherever it was last used. Thus it cannot provide a nesting site that might be used yearly by a certain pair of birds.—ARTHUR E. STAEBLER, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

Doricha enicura **in Honduras and Chiapas, Mexico.**—This species seems never to have been found outside of the country of Guatemala. About a year ago, I obtained from Mr. C. F. Underwood, a female which was collected at Montaña La Cruz, Honduras, on July 1, 1936. Recently an immature male has also come from Mr. Underwood, taken at Soluteca, La Paz, Honduras, on April 6, 1937. These two, apparently, constitute the first records for the country of Honduras.

During the summer of 1938, four males were received, secured at Comitán, Chiapas, Mexico, all of them collected between September 13, 1937, and September 20, 1937, inclusive. The occurrence of these birds in Chiapas is apparently a first record for any part of Mexico, unless the authors of the 'Biologia Centrali-Americana' (2: 345, 1897) were incorrect when they came to the conclusion that de Oca "mistook *D. eliza* for the present bird."—Robert T. Moore, *California Institute of Technology, Pasadena, California.*

Persistence in egg-laying by injured Robin.—At 3.00 p.m., on May 26, 1937, I was crossing a pasture field of the Abel Rynders farm in Cohocton Township, Steuben County, New York, and approached a weed- and brush-grown fence-row that paralleled a macadam road. A medium-sized shrub in this fence-row, which I later identified as witch hobble (*Viburnum alnifolium*) attracted my eye and I leaned over to snap off a branch for later identification. As I did so, a female Robin (*Turdus migratorius*) flew from her nest atop a stump about a foot below my outstretched hand, and two feet above the ground, then suddenly 'nosedived' to a partially dried-up roadside drainage ditch about six feet below the fence-row elevation. She now commenced dragging one wing and fluttering along the ground, apparently simulating a crippled bird. Following her I caught her easily and found the wing injury to be real, and an apparent nerve-paralysis as no bones were broken. In leaving the nest she had struck her wing either on the barbed-wire fence or a snag that projected from the stump at the nest level. Taking the injured bird to a veterinarian the nerve paralysis was confirmed and a careful examination again showed no broken bones. The injured bird was returned to the nesting site and released at 5.30 p.m. The nest contained one egg.

At 1.30 p.m. of the following day, May 27, 1937, I returned to the Robin's nest and found to my surprise that a Robin was on the nest. In order to determine whether it was the injured female or, possibly the male bird, it was necessary to flush the bird. The Robin allowed very close approach this time and did not leave the nest until my outstretched hand was within a foot distant. It then fluttered from the nest and proved to be the injured female with complete inability to fly. It ran agilely along some dead limbs that leaned against the fence and nesting stump, to reach the ground. The nest now contained two eggs! Evidently another egg had been laid since twenty hours ago when the Robin was returned to the nest.

I did not have an opportunity to revisit the nest until 10.30 a.m., June 1, 1937. The Robin was gone and remnants of eggshells were lying at the foot of the nesting stump. A careful search along the fence-row failed to reveal feathers or any trace of what had caused the nest to be broken up.—J. Kenneth Terres, *Soil Conservation Service, Bath, New York.*

Robin and Mourning Dove use the same nest.—Two eggs of a Robin (*Turdus migratorius*) and one of a Mourning Dove (*Zenaidura macroura*) were observed in a typical Robin's nest situated at a height of seven feet in the fork of a sweet-cherry tree near New Castle, Pennsylvania, on May 8, 1933. Two days later several hours were spent observing the nest and the females of each species were found taking

turns at incubation. At no time was evidence of antagonism noted on the part of either bird. But apparently all had not gone well as the remains of one Robin's egg was found on the ground at the base of the tree, so that one egg of each species remained. As one approached the nest, the incubating bird would quietly leave and invariably its place would soon be taken by the female of the other species which in the meantime had remained perched on a limb about fifteen feet away. This exchange was repeated a number of times. Neither male bird was seen near the nest. Unfortunately the nest was destroyed the following day by boys.

In view of the unusual nesting I was greatly surprised when visiting the area the following year on May 12, to see a Robin's nest at precisely the same spot containing two eggs of a Robin and two of a Mourning Dove. As before the birds shared the duties of incubation and this time the eggs were hatched and the young were fed and brooded for eight days. Upon approaching the immediate vicinity when the young were in the nest the female Mourning Dove would run through the adjacent field simulating a broken wing while the female Robin showed alarm by scolding loudly from a limb nearby. Upon my return on the ninth day all four young were dead in the nest. No observations were made the following spring as the tree had since been removed.—Edward C. Raney, *Zoological Laboratory, Cornell University, Ithaca, New York.*

Geographic variation of the Veery.—In the course of identifying Ohio Veeries the writer recently discovered further evidence supporting the suspicions of Howe (Auk, 17: 20, 1900) and Bangs (Bull. Mus. Comp. Zool., 70: 331, 1930) that the form described by Ridgway from Fort Garland, Colorado, as *Hylocichla fuscescens salicicola*, commonly called the Willow Thrush, might eventually be found to have an unbroken range across the continent, occupying in the east a position north of the range of the well-known Wilson's Thrush, *Hylocichla f. fuscescens*. Recent published statements of the range of the Willow Thrush, including the 1931 edition of the A. O. U. 'Check-list,' give it as east to Wisconsin "(and apparently also Newfoundland)" thus postulating a discontinuous distribution. Van Tyne (Occ. Papers Mus. Zool., Univ. Michigan, no. 379, p. 29, 1938) has recently found that the breeding form in Michigan is *H. f. salicicola* thus extending the range of the Willow Thrush east of Lake Michigan. Furthermore, the writer found that six specimens collected by himself at Fish Bay on the south shore of Lake Nipissing, Ontario, were also *salicicola*, thereby establishing a further step, which extends the range to the east of Lake Huron.

In the course of his investigations the writer examined, in the Museum of Comparative Zoölogy, eight topotypical specimens of *H. f. fuliginosa*, described by Howe (Auk, 17: 270–271, 1900) from Codroy, Newfoundland, and is convinced that Bangs was correct in referring these to *H. f. salicicola*. Howe had originally identified these birds as *salicicola* and shortly afterward described them as a new subspecies. Although Newfoundland specimens average somewhat more rufescent than typical *H. f. salicicola*, as do also the Lake Nipissing birds, this character merely indicates a tendency toward intergradation with *H. f. fuscescens* and is not sufficient to warrant recognition of a third subspecies. There is of course a rather wide gap between Lake Nipissing and Newfoundland whence no specimens of the Willow Thrush have yet been reported. Examination of breeding specimens from the northern part of the range of the species in Quebec might supply the connecting link.

The range of *H. f. fuscescens* extends southwestward from Nova Scotia, whence a single specimen has been identified, at least to the west end of Lake Erie and south in

the Appalachian Mountains to northern Georgia. In Ohio it breeds only in the extreme northern part of the State. Specimens from west of Toledo and just south of the Michigan boundary in Ohio, are intermediate but closer to *H. f. fuscescens*, particularly in the nature of spotting on the breast. Since, as stated above, Van Tyne refers the breeding Veeries of Michigan to *salicicola*, the dividing line between the ranges of the Willow and the Wilson Thrushes in that region must be rather close to the Michigan-Ohio boundary. No specimens have been seen from northern Indiana where the species is reported to breed, so it cannot now be said whether or not northwestern Ohio is the western limit of the range of *H. f. fuscescens*.

In coming to the above conclusions, comparisons were made by using the following specimens taken during the breeding season:

Hylocichla fuscescens fuscescens (Stephens), type locality Pennsylvania.—Nova Scotia, 1; Pennsylvania, 6; Maryland, 3; North Carolina, 1; northeastern Ohio, 20; northwestern Ohio, 5.

Hylocichla fuscescens salicicola Ridgway, type locality Fort Garland, Colorado.—British Columbia, 2; Washington, 2; Oregon, 1; Idaho, 1; Montana, 3; Wyoming, 2; North Dakota, 1; Lake Nipissing, Ontario, 6; Codroy, Newfoundland, 8.

There have been numerous records of the Willow Thrush taken during migration in eastern United States. The wonder is that occurrences are not recorded more frequently if the range of that subspecies does extend in an unbroken belt across eastern Canada. However, of the fifteen migrant Veeries from Ohio which the writer examined, only three, or 20%, seem to be referable to *H. f. salicicola*. These include one previously reported specimen (Aldrich, Auk, 53: 98, 1936) from Cleveland, taken September 17, 1931; one from Springfield Township, Lucas County, collected by Louis W. Campbell, May 14, 1935; and one from Mechanicsville, Ashtabula County, taken by Frank W. Braund, May 15, 1937. The Cleveland and Ashtabula County specimens are in the Cleveland Museum of Natural History, while the Lucas County bird is in the Ohio State Museum at Columbus.

In view of the difference of opinion in the literature regarding the relative importance of size as a distinguishing character between the two forms of Veery, it might be of interest to note here that the writer found no significant average difference in the series of the two races. Measurements of the above recorded specimens were as follows:

H. f. fuscescens.—Adult male in breeding season (25 specimens): wing, 94–107 (average, 100.6) mm.; tail, 66–79.5 (73.4); exposed culmen, 13–15.5 (14.2); tarsus, 27–31 (29.3). Adult female in breeding season (11 specimens): wing, 93.5–98.5 (average, 94.9) mm.; tail, 65.5–71.5 (68.3); exposed culmen, 13–15 (13.7); tarsus, 27.5–31 (28.4).

H. f. salicicola.—Adult male in breeding season (13 specimens): wing, 94.5–103.5 (average, 98.6) mm.; tail, 65.5–78 (72.5); exposed culmen, 13–15 (14.1); tarsus, 28–31 (29.5). Adult female in breeding season (4 specimens): wing, 90–98 (average, 94.1) mm.; tail, 64–74 (69.3); exposed culmen, 12.5–14 (13.2); tarsus, 27.5–29 (28.6).

The only satisfactory distinguishing characters are: darker, more olivaceous, less rufescent coloration of the upper parts, and the larger and more blackish spots on the breast of *H. f. salicicola*. Newfoundland and Ontario breeding specimens and Ohio migrant specimens of *H. f. salicicola* average slightly paler and more rufescent than typical specimens of that race, although they can be matched by individual specimens of the Willow Thrush from the Rocky Mountains and westward.

The writer is indebted to the authorities of the United States Biological Survey and the Museum of Comparative Zoölogy for the use of pertinent material for comparison,

and to Dr. Harry C. Oberholser for advice in connection with the determination of the specimens.—JOHN W. ALDRICH, *The Cleveland Museum of Natural History, Cleveland, Ohio.*

Hybrid *Vermivorae* in the Chicago region.—In 'The Auk' for July, 1938, the writer published a note on the Brewster's Warbler (*Vermivora leucobronchialis*) in the Chicago region, giving details of the discovery of the breeding of this hybrid in that area. The present note summarizes the more satisfactory and extensive observations made during the following breeding season (June 14, 17, and 18, 1938) in the same area, Deerfield Township, Lake County, Illinois (in that note, the locality was erroneously designated as in Cook County). The area within which these observations were made covered approximately ten acres.

On June 14, 1938, the recorded number and distribution of Blue-winged Warblers (*Vermivora pinus*) indicated that there were at least three nesting pairs. One nest of a pair of Blue-winged Warblers containing six young (five to six days old) was found on the ground beneath a small blackberry shrub in a semi-open grassy woodland. A male Golden-winged Warbler (*Vermivora chrysoptera*) in full song was located in the same general territory occupied by this species the previous summer (see earlier note, referred to above). On June 18, the writer with Mr. Sydney Stein, Jr., of Chicago, located a brood of at least three young warblers just out of the nest attended by a female Blue-winged Warbler and the male Golden-winged Warbler, mentioned above. As well as could be ascertained, these young conformed to the juvenal plumage of the Blue-winged Warbler, indicating that the mating was probably one of pure *pinus* with impure *chrysoptera*. That there were additional young in the brood was probable as the female, making the round and feeding the young, was noted to remain away for more or less definitely spaced periods between her visits to the three young which we were able to keep under our eyes. The male Golden-wing accompanied the female most of the time but was never seen to feed the young. In the observers' presence, the male Golden-winged Warbler feigned injury by fluttering its wings and, at the same time, bending forward and raising its tail. Mr. Stein was fortunate in seeing the male apparently attempt to lead the young from the observer's presence by perching next to one of the young, then fluttering the wings and moving along the branch causing the young bird to move, and repeating the performance with a second youngster.

Soon after, a Brewster's Warbler, very likely a female, was discovered attending a brood of at least two young, one of which appeared to be a juvenal Blue-winged Warbler and the other, decidedly grayer, a juvenal Brewster's Warbler. The plumage of this adult Brewster's Warbler was typical, the wing-bars being yellow and the white under parts having a more or less restricted yellow breast-patch. Another Brewster's Warbler, a male observed in full song, had clear white under parts and the yellow wing-patch of *chrysoptera*. Its song was identical with that of one of the Blue-winged Warblers occupying a neighboring territory and also with that described in the above-mentioned note.—FRANK A. PITELKA, *Lyons, Illinois.*

Flight song of the Blue-winged Warbler.—On June 17 and 18, 1938, the writer observed and recorded the flight song of the Blue-winged Warbler (*Vermivora pinus*). Subsequent perusal of the numerous references containing notes on calls and songs and particularly those of Mr. A. A. Saunders revealed no mention of a flight song in this species. Correspondence with Mr. Saunders indicated that though the flight song of the Blue-winged Warbler had been observed in the past, there was no definite record, and in spite of its being a more or less rare phenomenon, the observation was worthy of publication.

These observations were made in a semi-open woodland-thicket tract bordering the Desplaines River, Deerfield Township, Lake County, Illinois, where the Blue-winged Warbler is a locally abundant summer resident. Though the flight song was observed on both of the above dates, unfortunately no record of frequency was made and the writer can only state that it was given at least several times. Essentially, the flight song was not different from the regular song, which could be interpreted as *zee-zee-zee-zee-zwee'* (rather than the usual inhale-exhale song) with the first four notes often increased to six and the last note decidedly ascending. The quality of the Blue-winged Warbler's notes, amply described elsewhere, need not be detailed any further. The observed flight song can be presented as follows:

tsee-
zwee'- *zwee'*
tzip- *tzip-*
zee-zee-zee-zee-zee-zee- *zee-zee-zee-zee-zee-zee-*

This pattern, though based on a single continuous performance, obviously consists of two renditions of the song, and on another occasion but the first part of this pattern was given, ending with the first *zwee'*. The notes, though high-pitched, insect-like, and rapidly repeated, particularly the *zee's*, were clear and syllabic, and the song as patterned above took no more than four seconds. The song accompanied normal, direct flight from the higher parts of trees and tall shrubs across more or less open areas.—FRANK A. PITELKA, *Lyons, Illinois.*

A very late Blackburnian Warbler.—On November 5, 1938, while watching a chickadee trying to extract sunflower seeds from some old heads on partially withered plants in the garden of my residence a few miles west of Niagara Falls, Ontario, I was astonished at the sudden appearance of a male Blackburnian Warbler (*Dendroica fusca*) in the low willows, almost at my elbow. The warbler, which appeared to be travelling in company with two chickadees, was remarkably fearless and afforded many opportunities for close observation. It was in and out of the garden repeatedly during the afternoon, and at dusk appeared to settle down for the night in a rather large weeping-willow tree which was still, at this late date, almost in full leaf. The following day, November 6, the warbler and the chickadees were again much in evidence in the garden, and once more at dusk the warbler was seen to haunt the big willow tree. After the week-end, I was not in the garden for several days, but in view of the fact that the Blackburnian Warbler again frequented the garden on November 11, its sudden appearances almost invariably heralded by one or both of the chickadees, it is probable that it had been in the immediate vicinity throughout the intervening period. An examination of the row of low willow trees which appeared to be so attractive to this particular warbler, revealed the presence of numbers of active aphids and innumerable newly laid aphis eggs, and it is probable that these insects and their eggs provided the major incentive for the repeated and prolonged visits of this very late migrant. The writer knows of no other record of Blackburnian Warblers lingering until so late in the autumn in this part of Ontario, and in this connection it is interesting to note that the latest fall-migration dates given by Chapman ('Warblers of North America,' p. 177, 1907) for any of the northern States is five or six weeks earlier than that now recorded from southern Ontario.—R. W. SHEPPARD, *1805 Mouland Ave., Niagara Falls, Ontario.*

Dickcissel in Worcester, Massachusetts.—Considerable local interest was aroused by the occurrence of a male Dickcissel (*Spiza americana*), October 23–29, 1938, at the feeding station of Mrs. Harry T. Gray, 6 Windemere Road, Worcester.

The bright plumage and the typical attitude of the bird left no question as to the species. The identification of the bird was checked by Mr. and Mrs. Perry E. Howe, of Worcester, and the writer. Others also visited the station and saw it.

The last record of a Dickcissel in the County that could be found at the Museum is of one taken "in Worcester County (probably near Fitchburg) on October 3, [1889] by I. C. Greene," as cited in Bagg and Eliot's 'Birds of the Connecticut Valley in Massachusetts,' p. 651, 1937. There is also an undated mounted male in the collection of the Worcester Natural History Society (no. 562), marked, 'Worcester, Mass., Nathaniel Paine.'—HARRY C. PARKER, *Worcester Museum of Natural History, Worcester, Massachusetts.*

Pine Grosbeak in the Northern West Virginia Panhandle.—A Pine Grosbeak, probably *Pinicola enucleator leucura*, was observed in Bethany, Brooke County, West Virginia, on December 12, 1938. The bird was an immature male, its head, back, and rump being rather pinkish, marked with small areas of tawny olive. It was unusually tame, and allowed me to observe it only ten feet away. Unfortunately, I was not able to collect it to assert its identity. The bird was seen on the campus of Bethany College, feeding on the berries of Japanese barberry, eating the seeds and rejecting the pulp. During the next three days the grosbeak was seen several times.

So far as I know, there have been only two previous West Virginia records of the Pine Grosbeak. On February 28, 1934, Mr. Maurice Brooks found five grosbeaks near French Creek, Upshur County (Redstart, 1: 4, March, 1934). Mr. Brooks believed these birds to be of the eastern race, *Pinicola enucleator leucura*. There is also an old record, made by Eifrig, of the grosbeaks along the Potomac River, but it seems uncertain whether they were seen on the Maryland or on the West Virginia side.—WILLIAM MONTAGNA, *Fernow Hall, Ithaca, New York.*

Grasshopper Sparrow caught in spider's web.—On August 15, 1937, George Gibbs, Soils Scientist with the Soil Conservation Service, noted the following experience while picking blackberries on Peters' Hill, three miles southeast of Bath, New York, in Steuben County.

"While picking blackberries at about 3.00 p.m., I suddenly came on a small sparrow [Mr. Gibbs' detailed description tallied with immature Eastern Grasshopper Sparrow] that was caught in the vertical web of a golden garden spider, *Miranda aurantia*. The wings of the Grasshopper Sparrow, *Ammodramus savannarum australis*, were spread horizontally and the bird seemed unable to move them. Both feet were also entangled and the bird was caught near the center of the web. The spider, a large female, had moved up to the top of the web, where it seemed waiting for the bird to cease its weak struggling. I released the bird from the web and after it had rested quietly in my hand for some moments, it flew off apparently unharmed. The vertical web had been strung between several blackberry bushes and was two feet above the ground. It seems quite possible that the bird would have died in the web from exhaustion and hunger, had I not been fortunate enough to find it in time."
—J. KENNETH TERRES, *Soil Conservation Service, Bath, New York.*

Status of the breeding Lincoln's Sparrows of Oregon.—At the time that McCabe and the present author worked on racial differentiation in the Lincoln's Sparrows (*Melospiza lincolnii*) no satisfactory sample of the breeding birds of Oregon was available. We reported (Condor, 37: 155, 1935) that five skins from the Blue Mountains of Oregon, representing both sexes, had wings that averaged slightly shorter than those of birds from the Canadian Rockies. Accordingly, the birds were

classed with *M. l. lincolnii* and not with the long-winged *M. l. alticola* of the Rocky Mountains of the United States and of the Sierra Nevada of California. At that time it was known that *alticola* bred in southern Oregon in the Crater Lake district.

In 1938, six breeding Lincoln's Sparrows were collected in the Cascade Mountains of central Oregon (vicinity of Bend) and twenty-three were taken in the mountains to the eastward (Ochoco National Forest, Wheeler and Crook Counties; Blue Mountains, Baker and Grant Counties). The four males from the Cascade Mountains vary in wing length from 64.6 to 67.8 mm. and average 65.6, and the two females measure 61.8 and 61.0. These are normal dimensions for *alticola*. The seventeen males and six females from eastern Oregon average 64.9 and 60.9 mm., respectively. These averages are similar to those for several of the populations of *alticola* and are but slightly lower than the general averages for that race (op. cit., pp. 151, 156). Individual males of *alticola* usually do not have wings shorter than 64.0 mm. In the sample from eastern Oregon three males fall below this minimum. Some of the group of five birds formerly available to us also fell below this limit and it is now seen that that group was not representative. The population of eastern Oregon as a whole clearly pertains to *alticola*, but it is not an extreme development of this race and it includes more than the normal proportion of small-sized variants.

The Oregon birds display variation in back color similar to that in populations of *alticola* from the southern Rocky Mountains. The variations in width of stripes are like those in birds from the Sierra Nevada. The occurrence of variants is as follows: ruddy, two; moderately ruddy, three; brown, twenty-three; narrow stripes, twenty-two; moderately broad stripes, six (compare op. cit., figs. 26, 28).

In summary, it is found that the Montane Lincoln's Sparrow, *M. l. alticola*, ranges northward in the Cascades of Oregon at least to the Three Sisters Peaks, and throughout the mountains of eastern Oregon wherever suitable habitat for the species is present. Probably *alticola* occurs even farther north in the Cascade Range, but determination of the exact geographic relations of *M. l. lincolnii*, *gracilis* and *alticola* in Washington and southwestern British Columbia awaits the assembling of breeding series from those regions.—Alden H. Miller, *Museum of Vertebrate Zoology, Berkeley, California.*

Lapland Longspurs in Bolivar County, Mississippi.—On December 2, 1938, in company with Mr. Van B. Chaney, county game warden, I was driving along the crown of the Mississippi River levee four miles (two miles by airline) north of Rosedale, Bolivar County, Mississippi, when we observed a flock of five longspurs feeding with a large flight of American Pipits (*Anthus spinoletta rubescens*) on burned-over ground along the slopes of the levee. I collected two of the birds and forwarded the skins to Dr. Alexander Wetmore of the U. S. National Museum, Washington, D. C., who identified them as Lapland Longspurs (*Calcarius lapponicus lapponicus*). I believe these are the first specimens of this form taken in Mississippi.—M. Gordon Vaiden, *Rosedale, Mississippi.*

Winter bird notes from the North Carolina coast.—In connection with investigations of the Cape Hatteras National Seashore, North Carolina, carried on in the past winter by the writers, certain bird observations were made which appear worthy of record.

Snowy Owl, *Nyctea nyctea.*—While driving on Chicamacomico Island from Oregon Inlet to Cape Hatteras, on December 13, 1937, Dr. Carl Russell and Howard noted a Snowy Owl in flight along the roadside at a point approximately twenty-two miles

north of the Cape Hatteras Lighthouse. The owl had evidently been perching near the sand trail—an alleged road—on the island, since it flew about 150 yards, alit upon a tussock and faced the automobile. The observers were able to study the bird carefully, as it remained in this position for several minutes.

There are few records for this species in the State. Pearson, Brimley and Brimley ('Birds of North Carolina,' North Carolina Geol. and Econ. Surv., 4: 184, 1919) list three specimens and a few sight records and Gross (Auk, 44: 488, 1927) mentions three specimens taken in the State in 1926. The above, however, appears to be the first recorded occurrence of the Snowy Owl on the North Carolina banks.

Blue-gray Gnatcatcher, *Polioptila caerulea caerulea*.—On January 10, 1938, we were surprised to find a gnatcatcher on the wooded dunes of Collington Island, Dare County, near the shore of Albemarle Sound. The bird was watched for some time, as it fed within a few feet of us, moving nervously from one weed-stalk to another.

The only previous winter record for the State, also obtained on the Banks, was made by Johnson, Nichols and Griscom (Auk, 34: 220, 1917) who observed a bird at the Monkey Island Hunting Club, Currituck Sound, on December 30, 1916.

Snow Bunting, *Plectrophenax nivalis nivalis*.—As the Snow Bunting is so rarely noted in North Carolina in winter, we are reporting a group of four, seen on January 14, 1938, with a flock of about thirty Horned Larks on the sandy flats a mile northwest of Cape Hatteras, Dare County.

Pearson, Brimley and Brimley (op. cit., p. 233) state that the species has been recorded twice in North Carolina, listing specimens taken at Pea Island on the coast and at Oriental. There are recent sight records for White Lake, Bladen County (Auk, 52: 460, 1935) and Lake Mattamuskeet (Auk, 52: 319–320, 1935). Cottam, Nelson and Williams (Auk, 54: 549, 1937) found large flocks on the coast at Kittyhawk, January 25, 1937, and collected specimens. All of the above records are from the eastern part of the State.—James O. Stevenson and William Johnston Howard, *National Park Service, Washington, D. C., and Richmond, Virginia.*

RECENT LITERATURE

Riley's 'Birds from Siam and the Malay Peninsula.'—This paper[1] by Dr. Riley enumerates the birds in the U. S. National Museum collected by the late Dr. W. L. Abbott and Dr. H. M. Smith. Dr. Abbott collected between 1896 and 1904 in the southern part of peninsular Siam, British Malaya, southern Tenasserim and the islands off its coast. Dr. Smith's birds were secured between 1924 and 1934, almost entirely within the boundaries of Siam, and from almost every part of the country. The two collections, as may be surmised, complement each other extremely well. A great number of forms are listed, and all but about twenty-one are birds found within the present-day boundaries of Siam.

Siam has an extent of 200,000 square miles, and with its beaches and mangrove, forested hills, and grassy plains supports a very large bird fauna of about a thousand forms. Of these Dr. Riley discusses no less than eight hundred, and therefore it seems a great pity that the remaining species were not included. No list of Siamese birds has appeared since Count Gyldenstolpe published his in 'The Ibis' for 1920. When that list was published the Siamese bird fauna was but sketchily known, and since that time, through the efforts of various collectors about 250 forms have been added to Count Gyldenstolpe's list. Therefore a complete, up-to-date list would have been of great use.

Dr. Riley has been working on the paper under review for several years, and as often happens, some of the latest information has not been included. For example, Yen has shown that the race *phayeri* of *Francolinus pintadeanus* is not tenable. Kinnear has shown that the race *tubiger* of *Glaucidium brodei* cannot stand. *Brachypodius atriceps major* should be called *B. a. cinereoventris* as shown by Chasen.

Dr. Riley has recorded a few birds from Siam for the first time, among which are two specimens of *Urocissa flavirostris robini*, both immature; this record should be taken with many reservations, as it seems highly improbable that a form generally considered a high-mountain one, should be found in the hot (low) hills of central Siam. The lack of a chapter on the zoogeography of Siam is keenly felt, and the absence of any sort of map is much to be regretted.

Dr. Riley has done a great service in re-examining and clarifying the status of many of Dr. Oberholser's types. He has given a useful list of Siamese localities, fixing the location of many towns, villages, mountains, etc., which are impossible to find on the usual maps. He has also compiled from literature a record of the various localities at which the species mentioned have been taken by various collectors and given a good outline of the range of each form. No field notes are given, no new forms are described, but interesting critical notes accompany each species.

Dr. Riley, it may be said, has done a good piece of work, which will be found most useful to future students of Siamese birds.—R. M. DE SCHAUENSEE.

Niethammer's Handbook of German Birds.—The second volume of the 'Handbuch der Deutschen Vogelkunde,'[2] of which the first volume was reviewed in

[1] Riley, J. H. Birds from Siam and the Malay Peninsula in the United States National Museum collected by Drs. Hugh M. Smith and William L. Abbott. Bull. U. S. Nat. Mus., no. 172, iv + 581 pp., 1938. Price 75 cents, Superintendent of Documents, Washington, D. C.

[2] Handbuch der Deutschen Vogelkunde, herausgegeben von Günther Niethammer, Band II: Pici, Macrochires, Upupae, Meropes, Halcyones, Coraciae, Caprimulgi, Striges, Cuculi, Accipitres, Gressores, Phoenicopteri, Steganopodes, and Anseres. 8vo, x + 545 pp., 9 text-figs., 2 pl. (col.); Akademische Verlagsgesellschaft, Leipzig, 1938. Price, RM. 15.

'The Auk' (1937, p. 552), comprises the first half of the non-Passeres from the woodpeckers to the ducks (following Hartert's sequence). The general arrangement of the first volume is retained, but much more detail is given under a number of subheadings, such as, migrations, fieldmarks, eggs, etc. Also treated are plumage, molts, size and weight, range, mating, incubation, fledging, food, parasites, etc. The particular value of this second volume for American readers lies in the fact that a large proportion of the genera and even some of the species treated in this volume, are also found in the United States. Some of these species are: Three-toed Woodpecker, Short-eared Owl, Barn Owl, Peregrine Falcon, Golden Eagle, Rough-legged Hawk, Goshawk, Osprey, Black-crowned Night Heron, European Cormorant, White-fronted Goose, most North American ducks, and many others. Important is, that in many of these species, there is much more known about the European representative than about the American.

There is no other book that gives even nearly as much correct information on continental European birds. Even the most recent literature is completely covered, including, in the treatment of the migration, the recoveries of banded birds.

There is a number of illustrations, including a colored plate; paper and printing are excellent, altogether a very commendable publication. It is a pity that the knowledge of North American birds has not yet reached the point where a publication like this or the 'Handbook of British Birds' could be prepared.—E. Mayr.

Allen's 'Golden Plover and other Birds' is an attractive volume[1] forming the second series of 'American Bird Biographies,' the first of which, published in 1934, proved its value in a wide popular demand. In each of its twenty-seven chapters, some characteristic bird of eastern North America relates its own life history or occasionally brings in further information concerning its near allies. Most of these bird autobiographies have previously appeared in 'Bird-Lore' under the Audubon Society's 'School Department,' of which the author is also editor. The success of these brief character sketches has led the author to continue the method of presentation in which each bird in turn recounts its affairs in easy conversational language. While this may tend to encourage the anthropomorphic trend of the younger readers, the whole is so skillfully done that the resulting feeling of more intimate acquaintance through the personal touch amply compensates for any possible misconception. The concluding pages consist of a series of questionnaires, one for each of the twenty-seven chapters, wherein the Latin name of each bird alone occurs, as a caption, to be followed by twenty-five questions, the answers to all of which may be found in the appropriate text. It thus becomes a book full of suggestions for Nature teachers in the elementary schools while as a school reader it should serve to arouse in younger persons a real interest in the study of birds.

The wealth of photographic illustration throughout the text is of the author's usual high order of excellence, although the reproduction of shaded areas may in some instances be unsatisfactory in half-tone cuts printed with the text. The seven beautiful full-page plates in color by Dr. G. M. Sutton further add to the attractiveness of the volume. There is no apparent method in the arrangement of the chapters which might perhaps have been grouped so that the sequence of the species treated should follow their systematic order as a further help for the reader. The lack of an index is hardly a serious matter, since the desired chapter may be readily found in the table of contents. As an authoritative, non-technical and well-presented account of

[1] Allen, Arthur A. The | Golden Plover | and other birds | 8vo, xiii + 324 pp., 7 colored plates and 240 text-figs. from photographs, 1939; Comstock Publishing Co., Ithaca, N. Y. Price $3.00.

some of our familiar birds, it is safe to predict for it a wide field of usefulness among junior students.—G. M. ALLEN.

Prince Taka-Tsukasa's 'Birds of Nippon', of which six parts of the first volume have thus far come out, now continues in a seventh[1] brochure treating of the birds of Japan and its various island dependencies. The first forty pages supplement the bibliography of all papers dealing with the avifauna, arranged according to the island groups, and in chronological order. The remaining thirty-two pages contain, besides many minor additions or corrections to previous parts, the accounts of several more species since made out as occurring in the area, including two pheasants (*Syrmaticus*), two megapodes (*Megapodius*), and the Willow Ptarmigan. There are also two more plates in color, one illustrating the eggs of various gallinaceous species (unfortunately without indication of the scale of reduction), and one showing the downy chicks. A third plate reproduces photographs of the site and nest-mound of the megapode. Apparently a further supplement is intended, as the text ends abruptly.

The bibliography should prove useful, with its inclusion of many references to papers in Japanese journals. It is to be regretted, however, that the abbreviations used are often too cryptic to enable the reader to reconstruct the title easily. Thus one may not readily interpret the abbreviation 'T'. for 'Tori' (Birds), 'Al.' for 'Alauda,' 'D.Z.,' or 'Sh. & D.' Occasional misprints are excusable in an English work published in Japan but some, as 'Vigor' for Vigors, might well have been eliminated with more careful reading by an English editor. Nevertheless, one may be glad that the book is written in the latter tongue and hope that present difficult conditions may not hinder its early completion.—G. M. ALLEN.

Mrs. Nice's 'Watcher at the Nest.'—The diversity of present-day interests imposes on the specialist that he present the results of his work in two forms: the one for those few who are technically conversant with the particular field of study and the other for a public who would like to know the general import of his discoveries. In the volume here reviewed[2] the author has transcribed for the many who have a genuine interest in birds, some of the results of her painstaking investigations that have already appeared as special studies of a more technical nature on the behavior of birds. In the opening chapter we are introduced to the two male Song Sparrows and their mates whose domestic life in adjacent home sites the author first followed in such minute and precise detail that she was later able to throw much light on the full meaning of their song, minor notes and behavior, their struggle for 'territories,' the manner of mating, territory defense, care of young, general social relations and life history. Succeeding chapters, comprising half the book, carry the study to other pairs of Song Sparrows in the same Ohio area. By means of distinctive colored bands, each individual could be readily identified and its characteristic behavior followed, so that it became a personality. For eight years the study was continued and the intimate lives not only of the two original pairs, but those of their progeny and neighbors were traced as of familiar friends. Of the many breeding birds thus marked and studied in this period, seventy-six were recorded for two years, twenty-four for three years, eight for four years, one for five, one for six, and one, a veritable patriarch, for eight years. Thus it was proved that while Song Sparrows continued

[1] The Birds of Nippon | By | Prince Taka-Tsukasa. | Volume 1 | Part 7 | The Bibliography | (continued) | Order Galli | (continued) | Addenda. | 4to, pp. cix–cxlviii, 327–358, pls. 18–19, 1 unnumbered, March 1, 1939; H. F. & G. Witherby, Ltd., London, and Yokindo, 7 Motozono-cho, Tokyo. 15 shillings.

[2] Nice, Margaret Morse. The Watcher | at the Nest | 8vo, 6 + 159 pp., illustr., 1939; The Macmillan Co., New York City. $2.00.

from year to year in the accustomed haunts, actually the population underwent constant change, with an average life of about two and a half years for an individual bird.

In the latter half of the book we are given further intimate glimpses of the habits of Cowbirds, the nesting of Magnolia and Black-throated Green Warblers, the history of an Oven-bird family, the persistent but ill-fated attempts of a pair of Bell's Vireos to raise a brood, followed by accounts of the misfit mating of a pair of Mourning Doves raised as pets, and the upbringing of a Bob-white under human companionship. A final chapter gives a picture of spring in Oklahoma, with pointed comment on the destructive practices of agriculture in parts of the Great Plains of our Southwest, where, "unless we mend our ways" future generations will sadly miss the beauty and variety of unspoiled Nature.

The author has succeeded admirably in presenting for the general reader a wealth of valuable and revealing details concerning the lives of her subjects which should prove stimulating to the more casual observer and open his eyes to the significance of bird behavior and the wide range of vicissitudes with which bird life is beset. At the same time, despite a thoroughly sympathetic attitude in writing of her bird friends, she has avoided too great a tendency to humanize them over much. The pages are embellished with a number of black-and-white sketches by Roger Peterson, illustrating particularly the Song Sparrow in characteristic poses. Here is an excellent example of what valuable results may be derived from intelligent and persistent observation of even the commonest birds.—G. M. Allen.

Peterson's 'Field Guide.'—The publication of this second and improved edition[1] of the author's well-known 'Guide' is indicative of the success the book has already achieved. Its special feature is that it affords a ready means of identification of birds seen at usual field ranges rather than in the hand. To its preparation he brings the unusual combination of an artist's training in the discrimination of form and color with a thorough field knowledge of the birds themselves. For example, the distinctive differences between various ducks or gulls are indicated as they appear in birds sitting on the water at a distance or in flight. Series of diagrammatic figures grouped on the plates in similar poses illustrate these characteristic details in such a way as to make direct comparison easy, while the very brief paragraphs of text concerning each give added critical points in the determination. Where there are closely similar subspecies, these with their ranges are listed without attempting to show their minute distinguishing traits.

The first chapter explains the method of using the book, after which the various families or subfamilies are taken up in turn, following the A. O. U. 'Check-list' of 1931. Forms described since that date are purposely omitted. Of the forty full-page plates of birds, only four are in color. These show the jays, blackbirds, meadowlark, orioles, tanagers, warblers and finches. Here the individual figures, with over thirty to a plate of warblers, are necessarily small, but are so arranged as not to appear overcrowded and show color patterns fairly well, though perhaps in certain cases the four-color process of reproduction leaves something to be desired in the values of tints. The other plates are uncolored but indicate values in black, white or intermediate tones, with sometimes an added note indicating color with a leader drawn to the part intended. A number of other birds are shown in text-figures. The index includes references to the nearest page where each figure is found, and there is a

[1] Peterson, Roger Tory. A Field Guide | to the Birds | giving field marks of all species | found east of the Rockies. sm. 8vo, xx + 180 pp., 4 colored and 36 uncolored pls., numerous text-figs., 1939; Houghton Mifflin Co., Boston, Massachusetts. $2.75.

concluding paragraph suggesting comprehensive works where the seeker may find more extended accounts of the birds.

This new edition is a decided improvement over the first, containing much additional matter in the way of further notes on identification, plate references in the text, sizes of birds in inches, and paragraphs on song and range. Besides a few more text cuts, four of the plates are new: two of shorebirds at rest, one of seabirds, and one of rails, gallinules and coots. Moreover, the area covered has been extended from the ninetieth to the one hundred and third meridian, so as to cover eastern North America to the eastern edge of the Rockies, a more natural division between East and West. The small size of the volume, with its abundance of illustration and its condensed statement of differential points makes it a thoroughly practical field book and companion, which cannot fail to be of value to the amateur as well as to the more experienced field naturalist.—G. M. Allen.

Menegaux's 'Birds of France.'—The fourth and concluding volume[1] of this pocket handbook has now appeared, forming the thirty-third in the series, 'Encyclopédie Pratique du Naturaliste' issued by Paul Lechevalier. On account of the death of M. Menegaux in 1937, this volume, containing the second half of the Order Passeriformes, from the tits, nuthatches and creepers through the wagtails, larks, sparrows, starlings and crows, has been prepared by his colleague Dr. Robert Didier of the Paris Museum. In this he has endeavored to make the book conform in method to the previous volumes, using so far as possible the unfinished manuscript left by Menegaux. As before, it consists essentially of two parts. In the first section, paged in Roman numerals, are keys to the families and genera of French birds, with a brief account of the important characters under each major group; then under each genus comes a key to the included species. Here, if the bird is of merely rare or casual occurrence, is given a brief description with statement of the general range, but if it is one of those regularly found in France, its name alone, in French and Latin, is given, followed by a page reference in Arabic numerals to the second section. Turning to the place indicated, the reader finds a full-page colored plate accompanied on the facing page by a longer account, giving the name in various European languages, a short description and a condensed statement of haunts, nesting, and general habits. The many colored plates are by J. Eudes, and show usually both sexes of the birds treated, with an inset figure of the egg. At first glance these aquarelles give a Christmas-card appearance, the birds often out of proportion, or with impossible feet and odd lumpy places, but a closer acquaintance makes one appreciate more and more a certain delicacy and charm imparted by the artist to the landscape backgrounds, affording an idea of the birds' haunts and habits, while the birds themselves in spite of the sometimes rather splotchy coloring, nevertheless produce a total effect that is rather pleasing. Thus the Skylark stands at the edge of a wheat field, lightly suggested, with red poppies scattered among the ripening grain, or a nuthatch pursues a brilliantly scarlet beetle on a pine branch; but one has a bit of a shock with a pair of Lapland Longspurs in a ferny growth at the edge of a birch forest.

An interesting and valuable feature is an account of the insects parasitic on the birds of France, with keys for their identification, and excellent outline drawings of the various genera of Mallophaga and bird flies, followed by a host list. This chapter is contributed by E. Séguy. Finally there is a thorough index to the figures and

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[1] Les Oiseaux | de | France | par | A. Menegaux | Volume IV | Passereaux (tome II) | . . . par le Dr. Robert Didier. small 8vo, pp. DCXIV-DCCXXXV, 213–402, 64 colored and 4 uncolored pls., 71 text-figs., 1939; Paul Lechevalier, Ed., 12, rue de Tournon, Paris-vi, France. 60 fcs.

descriptions in the whole four volumes of the work. Despite some failings in the matter of convenient reference or in details of the colored plates, the set, neatly bound in gray cloth, makes an effective pocket guide to the birds of France.—G. M. ALLEN.

Peterson's 'Junior Bird Book.'—Close on the heels of his 'Field Guide,' this versatile author now presents a bird book designed to encourage an interest among school children not only in the familiar birds about them but also in a somewhat wider circle of eastern species. In this attractive little volume[1] the ten-year-olds will make acquaintance with some two dozen species, selected with a view to illustrating various representative types from eight orders of birds. Beginning with the Loon as an example of a large waterbird, the author takes up in succession the Canada Goose, the famous Canvas-back, the Red-shouldered Hawk, the Herring Gull, the odd little Burrowing Owl, Belted Kingfisher, Ruby-throated Hummingbird, the bright-colored Blue Jay, the familiar Crow and various warblers and other commoner species. With each goes a page or two of very simply told narrative, bringing out the characteristics of the different birds and their human value in a conversational style that any child may follow with interest and profit. Abundant marginal sketches illustrate the appearance of young and old, and emphasize special habits, such as those of the Loon swimming at the surface or diving for fish; Crows mobbing an owl; Orioles at work on their pendulous nest; or the bounding flight of the Goldfinch. In addition a full-page colored plate shows each species in typical surroundings. These plates are mainly reproduced from Audubon leaflets and represent the work of various well-known artists—Allan Brooks, Fuertes, Horsfall (some of the last-named dating back to 1909 and still serving), while one of warblers is new, the work of the author himself. Although in all cases the reproductions are not equally good, they will nevertheless have much appeal to young persons. It was the part of wisdom not to make it a book of odd size as so often children's books are, nor to make it too ponderous with the many species to be treated. With its abundance of illustration, and the brief simple text, this will undoubtedly prove a treasured volume in any child's library.—G. M. ALLEN.

'Conservation in the United States' is a timely volume,[2] written by four Cornell professors, designed to bring forcibly before the intelligent public the need for a wiser use of our natural resources, in order that we may not only derive present benefits from them but also may hand on to future generations their natural heritage in the enjoyment of these things. The pioneer days of thoughtless and profligate waste are over. Already we are seeing and feeling the effects of past years of exploitation. A generation ago, this began to be evident to far-seeing minds. A beginning has been made in the process of taking an inventory of our possessions with a view to correcting as far as may be the mistakes made in the past. In plain words, and with the aid of abundant illustrations, the authors set forth exactly what is happening in this land of ours as a result of a century or more of intensive and short-sighted use of what seemed boundless treasure.

In the Introduction by Professor Gustafson, is given a resumé of the history of Conservation in this country, with the strong admonition that the younger generation "must come to the realization that future supplies of food, clothing and other

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[1] Peterson, Roger T. The Junior Book | of Birds. 8vo, xv + 92 pp., 23 pls. in color, 1939; Houghton Mifflin Co., Boston, Massachusetts. Price $2.00.

[2] Conservation | in the United States | by members of the Faculty of Cornell University: | A. F. Gustafson, H. Ries, C. H. Guise, W. J. Hamilton, Jr. 8vo, xi + 445 pp., illustr., 1939; Comstock Publishing Co., Inc., Ithaca, New York. Price $3.00.

necessities are being jeopardized by the uneconomical and sometimes careless or wasteful methods of the present day." He divides natural resources into two groups: those that are exhaustible, such as coal, many minerals, oil and gas; and those that are renewable, such as forests, soils, grazing lands and wildlife, provided that they have not already been too far depleted. In the body of the book, each of the co-authors contributes a section dealing with his special field. Part I by Professor Gustafson, treats of soils and water resources, the eventual source of our sustenance. Part II by Professor Guise deals with forests, parks, and grazing lands. Part III by Dr. W. J. Hamilton, Jr., considers our wildlife and its legitimate use, from both economic and esthetic points of view; while Part IV by Professor Ries surveys our mineral wealth and the use made of it.

Wildlife resources, from varied commercial fisheries to the less tangible but equally important uses of sport and esthetic enjoyment, are treated in a fair-minded and interesting manner. We are reminded of the former abundance of many kinds of animals, such as sturgeon, wild pigeons, bison, which have suffered through human destruction; of the past and present economic value of our fisheries and furbearers; and of the increasing enjoyment by our people of natural beauty, and the invigoration resulting from camping, hunting, and observing of wild animals. While herds of bison or bands of wolves cannot be compatible with intensive agriculture so that the reduction of some forms of life is unavoidable where they come in too close contact with expanding humanity, nevertheless wise provision may be made for a reasonable balance if we take the matter in hand before it is too late, for we are learning that predators and even pests may have their value.

Here is an attractive and authoritative volume that should be in every public library of our land, and in the hands of every teacher of economics or geography.—G. M. Allen.

'Zoological Record: Aves.'—The annual section on 'Aves' giving the list of titles on birds with analysis by subjects for 1937, is now ready, bearing the date of November 1938. The immense amount of work involved in its preparation is evident on most casual inspection. Compiled by W. L. Sclater, it[1] is as usual divided into three sections. The first is a list of titles arranged alphabetically by authors, and comprises in all just over 1700, including a few of the previous year. The second section is a subject index in which the authors are listed with references to their titles by number, under the subjects of: General Works, Anatomy, Embryology, Physiology, Ethology (or habits), Aetiology (genetic and evolutionary aspects), and Geography; each group is divided by subtitles so that the investigator may readily find the literature on nearly every subject he may be interested in. The third or Systematic Section analyzes the titles according to the orders and families of birds, with very brief indication of the purport of the article in which the given species is treated. It is interesting to notice here that the number of newly described forms from all parts of the globe still continues to grow, but more particularly among the subspecific groups. Thus there are listed for the year 1937, no less than some 282 new subspecies, but only twenty-three 'full species' and a dozen or so new genera, most of which are fossil forms, or extinct birds named from old pictures such as the White Dodo of Réunion, or again, result from further subdivision of genera previously known. From this it is clear that the pioneer exploration of the world for new forms is over, and it remains chiefly for the systematist to review the material now in collections and to make further revisions and refinements in classification.

[1] Sclater, W. L. Zoological Record. Aves, 1937. 8vo, 116 pp., Nov. 1938; Zoological Society of London, Regent's Park, London. Price 7*s*., 6*d*.

There is no other index to the annual literature of the subject that covers so much and presents it in such a condensed and well-analyzed form. With the enormous output of ornithological publication year by year, the student would be immensely handicapped without this aid. It is clear, too, that a responsibility lies with authors not only to make their titles short but also to supply with longer articles a brief summary in order that the compiler of such a work as the 'Zoological Record' may get at the gist of a paper with the least labor. The section on 'Aves' is separately obtainable for a very small sum, and should be more widely in the hands of students of ornithology.—G. M. Allen.

Periodical Literature

Abbott, Cyril E. The skulls of ducks. Wilson Bull., **50:** 249–253, figs. 36–39, Dec. 1938.

Adlersparre, A. Ueber das Verhalten zweier *Pyromelana*-Arten bei karotinoidreicher und karotinoidarmer Kost. Journ. f. Ornith., **87:** 24–27, Jan. 1939.

Ahlqvist, Holger. Bortflyttning av fåglar som en följd av ogynnsamt väder under våren. Ornis Fennica, **15:** 111–117, 6 text-figs, Dec. 10, 1938 (German resumé).—Two instances of a reversal of spring migration in Finland coincident with sudden cold and snow.

Ali, Salim. An additional list of birds from Hyderabad State. Journ. Bombay Nat. Hist. Soc., **40:** 497–499, Dec. 1938.

Ali, Salim, and Abdulali, Humayun. The birds of Bombay and Salsette. Journ. Bombay Nat. Hist. Soc., **40:** 366–381, 1 pl., Dec. 1938.—Continues owls to partridges.

Altmann, M., and Hutt, F. B. The influence of estrogens in egg yolk upon avian blood calcium. Endocrinology, **23:** 793–799, Dec. 1938.

Aspden, Wm. Hen-harriers breeding in Anglesey. British Birds, **32:** 326–328, Mar. 1, 1939.

Bailey, Alfred M., and Niedrach, Robert J. Fan and bubble dance, photographing the Cock of the Plains. Rocky Mt. Sportsman and Western Wild Life, **2:** no. 5, 8–11, 30–31, Apl. 1939.—With many photographs of Sage Grouse in display and of nesting in Colorado.

Bailey, Alfred M., and Niedrach, Robert J. The Chestnut-collared Longspur in Colorado. Wilson Bull., **50:** 243–246, fig. 35, Dec. 1939.

Bailey, Harold H. Labrador bird records. Bull. Bailey Mus. and Libr. of Nat. Hist., Miami, Florida, no. 12 (= 13), 2 pp., Jan. 5, 1939.—Ten records of unusual birds from vicinity of Red Bay, Labrador, including Blue-winged Teal, Iceland and Kumlien's Gulls, Pacific Kittiwake, Sora Rail, Eastern Cowbird, and Great Gray Owl.

Baker, B. W. Observations on the Ruby-throated Hummingbird. Jack-pine Warbler, **17:** 13–15, text-fig., Jan. 1939.—In Michigan.

Balli, Antonio. Ricerche sul rapporto tra peso del fegato e peso del corpo in *Passer italiae* Viell. Rivista Ital. di Ornith., **9:** 96–102, Apl. 1939.—Ratio between body weight and that of the liver.

Barnes, Alice M. Birds observed in and near Tambaram, Chingleput district, South India. Journ. Bombay Nat. Hist. Soc., **40:** 467–476, Dec. 1938.

Bates, G. L. Notes on spring migrants in Arabia. Bull. British Ornith. Club, **59:** 23–24, Nov. 30, 1938.

Baumgartner, Frederick M. Courtship and nesting of the Great Horned Owls. Wilson Bull., **50:** 274–285, Dec. 1938.

BENNETT, LOGAN J., AND HENDRICKSON, GEORGE O. Censusing quail in early fall. Journ. Wildlife Management, **2**: 169–171, Oct. 1938.

BENNETT, LOGAN J., AND HENDRICKSON, GEORGE O. Censusing the Ringneck Pheasant in Iowa. Trans. Third No. Amer. Wildlife Conference, pp. 719–723, 1938.

BEQUAERT, J. Hippoboscid flies from North American doves. **Science, 89**: 267–268, Mar. 24, 1939.—The fly *Microlynchia pusilla* is a vector of the dove disease caused by *Haemoproteus columbae*.

BERGMAN, GÖRAN. Auffallender Raubvogelzug unter den Einwirkung von steigenden Luftströmungen. Ornis Fennica, **15**: 107–111, 5 text-figs., Dec. 10, 1938.—Strong ascending air currents effect concentration of migrating hawks.

BERNDT, RUDOLF. Untersuchungen über die zweite Brut beim Star (*Sturnus v. vulgaris* L.) im Braunschweiger Hügelland. Der Vogelzug, **10**: 7–16, Jan. 1939.—Analysis of cases of two broods a season.

BERNDT, RUDOLF, AND HINSCHE, ALFRED. Starker Bienenfresser-Einfall (*Merops apiaster* L.) in Anhalt. Ornith. Monatsber., **46**: 136–138, Sept. 30, 1938.—An invasion of Bee-eaters in Germany, in May 1935.

BETTS, F. N. The birds of the Laccadive Islands. Journ. Bombay Nat. Hist. Soc., **40**: 382–387, pl., Dec. 1938.—Lists forty-four species, of which all but fourteen are waterbirds.

BISHOP, FRANK. The Pileated Woodpecker in Clinton County [Michigan]. Jack-pine Warbler, **17**: 15–16, Jan. 1939.

BRAND, ALBERT R., AND KELLOGG, P. PAUL. Auditory responses of Starlings, English Sparrows, and Domestic Pigeons. Wilson Bull., **51**: 38–41, Mar. 1939.—Pigeon has lowest range, Starling highest of the three.

BRAUN, RUDOLF H. Beobachtungen über das Nachtleben von *Rhinoptilus chalcopterus*. Journ. f. Ornith., **87**: 95–96, Jan. 1939.—Nocturnal habits of this plover in Africa.

BRODKORB, PIERCE. New subspecies of birds from the district of Soconusco, Chiapas. Occ. Papers Mus. Zool., Univ. Michigan, no. 401, 7 pp., Mar. 1, 1939.—*Crypturellus cinnamomeus soconuscensis, Odontophorus guttatus matudae, Oreopyra viridipallens ovandensis, Pteroglossus torquatus esperanzae* and *Oncostoma cinereigulare pacificum*.

BRUCKNER, J. H. The inheritance of melanism in pheasants. Journ. Heredity, **30**: 45–52, 2 text-figs., Feb. 1939.

CAMERON, A. C. Birds drinking in the dry interior [of Australia]. Emu, **38**: 336–337, Nov. 1, 1938.—Parrots, pigeons and others may "come regularly from as far away as ten or twelve miles" to drink at wells.

CAMPBELL, A. G. Charting bird movements. Emu, **38**: 317–322, Nov. 1, 1938.—Migratory movements of twelve Australian species.

CAMPBELL, A. G. Supposed female and eggs of *Atrichornis clamosa* (Gould). Emu, **38**: 355–356, Jan. 2, 1939.—Description of the eggs and female of the apparently extinct Noisy Scrub Bird of southwestern Australia.

CANNON, D. G. On the parasites of the small intestine of the European Starling (*Sturnus vulgaris*) in Quebec. Canadian Field-Naturalist, **53**: 40–42, Mar. 1939.

CASSIDY, JAMES. Flycatchers and humming birds of Canada. Avicult. Mag., (5) **4**: 52–56, Feb. 1939.

CHRISTOLEIT, E. Zur Brutbiologie des Kranichs. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15**: 1–8, Jan. 1939.—Breeding habits of Crane in Prussia.

CHRISTOLEIT, E. Zur Brutbiologie des Kranichs. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15:** 63–71, Mar. 1939.—Breeding habits of European Crane.

CLANCEY, P. A. A new race of the moorhen from Scotland. Bull. British Ornith. Club, **59:** 69–70, Feb. 6, 1939.—*Gallinula chloropus vestigialis.*

COFFEY, BEN B., JR. Blackbird banding in the mid-South—1. The Migrant, **9:** 59–63, Sept. 1938.—Records of recoveries of Grackles, Red-wings and Rusty Blackbirds.

COMYN, KENNETH. Swifts in swallows' nests. Journ. Bombay Nat. Hist. Soc., **40:** 575–576, Dec. 1938.

CONOVER, H. B. A new pigeon from Colombia. Zool. Ser. Field Mus. Nat. Hist., **20:** no. 36, 477–478, Dec. 31, 1938.—*Columba cayennensis tamboensis* from El Tambo, Cauca.

DARLINGTON, P. J. The origin of the fauna of the Greater Antilles, with discussion of dispersal over water and through the air. Quart. Review of Biol., **13:** 274–300, 5 text-figs., Sept. 1938.—Hurricanes as agents.

DEADERICK, WILLIAM H. A preliminary list of the birds of Hot Springs National Park and vicinity. Wilson Bull., **50:** 257–273, Dec. 1938.

DE BEAUX, OSCAR. Il primo fringillide nordamericano (*Passerella iliaca iliaca*, Merr.) catturato in Italia. Rivista Ital. di Ornith., **9:** 103–107, text-fig. 1, Apl. 1939.—The first North American fringillid to be taken in Italy is a Fox Sparrow captured at Genoa, December 7, 1936.

DEIGNAN, H. G. *Turdus aureus angustirostris* Gyldenstolpe and *Oreocincla horsfieldi affinis* Richmond. Journ. Siam Soc., Nat. Hist. Suppl., **11:** 119–122, 1938.

DEIGNAN, H. G. The Pygmy Woodpeckers (*Dryobates nanus* subspp.) of Siam. Journ. Siam Soc., Nat. Hist. Suppl., **11:** 123–124, Dec. 1938.

DELACOUR, J. Breeding results at Clères. Avicult. Mag., (5) **4:** 2–4, Jan. 1939.

DEMANDT, C. Der Steinadler als Brutvogel in Vorarlberg. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15:** 14–16, Jan. 1939.

DOVE, H. STUART. Migrants in the Mersey district, Tasmania. Emu, **38:** 376–377, Jan. 2, 1939.

DROST, RUDOLF. Geschlechtsunterschiede am Schnabel der Silbermöwe, *Larus a. argentatus* Pont. Ornith. Monatsber., **46:** 129–131, Sept. 30, 1938.—An index of height of bill at angle divided by least height gives for males a range from 52.2 to 57.3, and for females, 42.0 to 50.5.

DROST, RUDOLF. Kennzeichnen für Geschlecht und Alter bei Zugvögeln V. Der Vogelzug, **10:** 1–6, 2 text-figs., Jan. [illegible]

DUNAJEWSKI, ANDRZEJ. Gliederung [illegible] Verbreitung des Formenkreises *Lanius schach* L. Journ. f. Ornith., **87:** [illegible]3, Jan. 1939.—Races and hybrids of this Oriental shrike.

ERRINGTON, PAUL L. The Great Horned Owl as an indicator of vulnerability in prey populations. Journ. Wildlife Management, **2:** 190–205, pls. 17–20, Oct. 1938.

ERRINGTON, PAUL L. The comparative ability of the Bob-white and the Ring-necked Pheasant to withstand cold and hunger. Wilson Bull., **51:** 22–37, Mar. 1939.—Susceptibility to cold attending decrease in weight usually more pronounced in Bob-whites, which also were less able to endure starvation.

ERRINGTON, PAUL L., AND STODDARD, H. L. Modifications in predation theory suggested by ecological studies of the Bobwhite Quail. Trans. Third No. Amer. Wildlife Conference, pp. 736–740, 1938.

EYLES, DON. Georgia wildlife areas. Oriole, **3:** 29–33, map, Dec. 1938.

EYLES, DON. Wilson's Petrel in Georgia. Oriole, **3**: 35–36, Dec. 1938.—One picked up at Tybee Beach, August 8, 1937, and later released, is the second State record.

FESTA, E. Il Nibbio bianco in Piemonte. Rivista Ital. di Ornith., **9**: 108, pl. 5, Apl. 1939.—Capture of the kite, *Elanus caeruleus*, for the first time in Italy.

FISHER, JAMES. The history of the Irish Gannet colonies. British Birds, **32**: 314–319, March 1, 1939.

FLEMING, C. A. Birds of the Chatham Islands. Part I. Emu, **38**: 380–413, pl. 46–53, Jan. 2, 1939.

FLEMING, J. H. The Great Lakes Ornithological Club. Wilson Bull., **51**: 42–43, pl. 3, Mar. 1939.

FREER, RUSKIN S. The birds of Lynchburg, Virginia, and vicinity. Bull. Lynchburg College, Lynchburg, **7**: no. 1, 27 pp., Jan. 1939.—A local list of 202 species, briefly annotated.

GANIER, ALBERT F., AND CLEBSCH, ALFRED. Some June birds of the Great Smokies. The Migrant, **9**: 41–45, Sept. 1938.

GARLING, MAX. Ueber den Wohnraum des Gartenammers in der Mark. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15**: 50–51, Mar. 1939.

GERBER, ROBERT. Tragen Altvögel ihre Jungen fort? Beitr. z. Fortpflanzungsbiol. d. Vögel, **15**: 17–24, Jan. 1939.—Instances of adults carrying young.

GILLIARD, E. T. A new race of *Grallaria excelsa* from Venezuela. Amer. Mus. Novitates, no. 1016, 3 pp., Feb. 20, 1939.—*Grallaria excelsa phelpsi*.

GOULD, [JOHN] commemorative issue. Emu, **38**: 89–244, pls. 28–37, Oct. 1, 1938.—This issue of 'The Emu' is devoted to papers concerning John Gould, his life, works, and correspondence.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Notes on eastern African birds. Bull. Brit. Ornith. Club, **59**: 24–27, Nov. 30, 1938.

GRANT, C. H. B., AND MACKWORTH-PRAED, C. W. Notes on East African birds. Bull. British Ornith. Club, **59**: 71–74, Feb. 6, 1939.

GROSS, MARGARET E. Why call it that? Nature Notes, Peoria, Ill., **6**: 34–36, Feb. 1919.—On the names of birds.

HAAS, GERHARD. Beiträge zum Vorkommen und zur Fortpflanzungsbiologie des Karmingimpels am Drausensee. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15**: 52–62, Mar. 1939.—Life history of *Carpodacus erythrinus*.

HALL, LINSCOTT A. Hawaiian bird notes. Oölogist, **55**: 101–102, Sept. 1938.

HAMERSTROM, F. N., JR. Central Wisconsin crane study. Wilson Bull., **50**: 175–184, text-figs. 25–26, Sept. 1938.—Breeding habits of Sandhill Cranes.

HAMPE, HELMUT. Zur Systematik von *Agapornis*. Ornith. Monatsber., **47**: 4–6, 1939.—Specific and subspecific status of various forms of this parrot genus.

HARRIS, A. TREVENNING. Nesting of the Herring Gull and Common Tern. Oölogist, **55**: 102–104, Sept. 1938.—In Wisconsin.

HEINROTH, OSKAR. Kingfishers in captivity, their rearing and breeding. Avicult. Mag., (5) **4**: 33–36, pl., Feb. 1939.

HENDRICKSON, GEORGE O., AND SWAN, CHARLES. Winter notes on the Short-eared Owl. Ecology, **19**: 584–588, Oct. 1938.—Food.

HICKS, LAWRENCE E. A unique population of water birds in northern Ohio—1937. Wilson Bull., **50**: 197–200, Sept. 1938.—Unusual concentration about temporary bodies of water.

HILDEBRANDT, HUGO. Das Vorkommen einiger sibirischer Drosselarten in Deutschland. Journ. f. Ornith., **87**: 87–94, Jan. 1939.—Summary of records of *Turdus sibiricus* and *T. obscurus* in Germany.

HINDWOOD, K. A. The occurrence of Crested Penguins in Australian waters: with particular reference to *Eudyptes pachyrhynchus*. Emu, **38:** 377–379, pl. 45, Jan. 2, 1939.

HUDSON, GEORGE E. Some ornithological results of a six-weeks' collecting trip along the boundaries of Nebraska. Nebraska Bird Review, **7:** 4–7, Feb. 25, 1939.

IREDALE, TOM. John Gould: the bird man. Emu, **38:** 89–90, Oct. 1, 1938.

JAENSCH, E. R. Der Hühnerhof als Forschungs- und Aufklärungsmittel in menschlichen Rassenfragen. Zeitschr. f. Tierpsychol., **2:** 223–258, text-fig. 1–13, Feb. 1939.—Psychology of the hen as a basis of comparison with that of man.

JAHN, HERMANN. Liste der vom 9. Juli bis zum 13. September 1938 bei Yamanaka (Fuji) und Umgebung beobachteten Vogelarten. Tori, Bull. Ornith. Soc. Japan, **10:** 174–179, Nov. 1938.

JOHNSON, ARCHIBALD. Nest building behavior in the Loggerhead Shrike group. Wilson Bull., **50:** 246–248, Dec. 1938.

JOHNSON, R. A. Predation of gulls in Murre colonies. Wilson Bull., **50:** 161–170, text-figs. 23–25, Sept. 1938.

KENNEY, F. R., AND MCATEE, W. L. The problem: drained areas and wildlife habitats. Yearbook U. S. Dept. Agric., separate no. 1611, pp. 77–83 (1–8), 1939.

KLEINER, ANDREW. A new jay from the Balkans. Bull. British Ornith. Club, **59:** 70–71, Feb. 6, 1939.

KURODA, NAGAMICHI. A small collection of birds from Halmahera or Gilolo. Tori, Bull. Ornith. Soc. Japan, **10:** 113–126, Nov. 1938.—New form: *Pachycephala pectoralis gilolonis*.

KURODA, N. On the trachea of rare species of Anatidae. Tori, Bull. Ornith. Soc. Japan, **10:** 195, Nov. 1938 (in Japanese).

LACK, DAVID. The display of the Blackcock. British Birds, **32:** 290–303, Feb. 1, 1939.

LAMOREUX, W. F., AND HUTT, F. B. Variability of body temperature in the normal chick. Poultry Science, **18:** 70–74, Jan. 1939.—"A pronounced rise in the body temperature of the chick during the first week after hatching."

LASHMAR, A. F. C. Further notes from Kangaroo Island. So. Australian Ornithologist, **15:** 13, Jan. 1939.

LASKEY, AMELIA R. Bird banding brevities—No. 13. The Migrant, **9:** 51–52, Sept. 1938.—Various returns and recoveries. A Junco banded at Blossomdell, Tennessee, November 29, 1937, was caught at Blaney Park, Michigan, April 14, 1938.

LAY, DANIEL W. How valuable are woodland clearings to birdlife? Wilson Bull., **50:** 254–256, Dec. 1938.—Distinctly favorable.

LEACH, E. P. Recovery of marked birds. British Birds, **32:** 329–335, Mar. 1, 1939.—In British Isles.

LEIVO, OLAVI. Ueber einen intensiven Massenzug im Frühling und seine Ursachen. Ornis Fennica, **15:** 93–104, Dec. 10, 1938.—Mass migratory movements may arise suddenly without relation to the weather. Certain facts set forth seem to indicate an electrical stimulus in the originating of such movements.

LEWIS, HARRISON F., AND SMITH, RONALD W. Apparent nesting of the Pigeon Hawk (*Falco columbarius*) in the city of Ottawa. Canadian Field-Nat., **53:** 45–46, Mar. 1939.

LISTER, M. D. An account of the Lapwing population on a Surrey farm. British Birds, **32:** 260–271, Jan. 2, 1939.

LIVESEY, T. R. Egg stealing by Khasia Hills Cuckoo (*Cuculus canorus bakeri* Hartert). Journ. Bombay Nat. Hist. Soc., **40:** 561–564, Dec. 1938.

LLOYD, HOYES. Banded Kittiwake from Russia recovered in Newfoundland. Canadian Field-Nat., **53**: 29–30, Feb. 1939.—Bird banded at the island of Kharlov, Barents Sea, June 19, 1937, and recovered the following September near Little Fogo Island, Newfoundland.

LORD, E. A. R. Notes on migratory birds—1937–38. Emu, **38**: 372–376, Jan. 2, 1939.—In Australia.

LOWE, PERCY R. On the systematic position of the swifts (suborder Cypseli) and hummingbirds (suborder Trochili), with special reference to their relation to the order Passeriformes. Trans. Zool. Soc. London, **24**: 307–344, 4 pls., text-fig., Mar. 1939.—In this important paper a series of twenty-two characters in swifts, hummingbirds, goatsuckers and broadbills is contrasted with the same characters in typical Passeres. The author concludes, in spite of lack of correspondence in the swallows, that the special characters wherein the swifts and hummingbirds diverge from the Passeres are due to their special method of existence and would include both as separate suborders of the Passeriformes, of which they form low evolutionary offshoots.

LOWTHER, E. H. N. Notes on some Indian birds. III.—Birds in my garden. Journ. Bombay Nat. Hist. Soc., **40**: 409–424, 6 pls., Dec. 1938.

MACNAMARA, CHARLES. Nesting of the Red-breasted Nuthatch (*Sitta canadensis*). Canadian Field-Naturalist, **53**: 33–34, Mar. 1939.

MAIN, JOHN S. Relation of temperature to early migration. Wilson Bull., **50**: 190–193, Sept. 1938.

MANWELL, REGINALD D., AND GOLDSTEIN, FREDERICK. The asexual life cycle of the avian malaria parasite, *Plasmodium circumflexum*. Science, **89**: 131–132, Feb. 10, 1939.

MARCHANT, S. The Irish Gannet colonies, 1938. British Birds, **32**: 320–325, March 1, 1939.

MAYR, ERNST. Birds collected during the Whitney South Sea Expedition. XXXIX. Notes on New Guinea birds. IV. Amer. Mus. Novitates, no. 1006, 16 pp., Dec. 28, 1938.

MAYR, ERNST. Birds collected during the Whitney South Sea Expedition. XL. Notes on New Guinea birds. V. Amer. Mus. Novitates, no. 1007, Dec. 29, 1938.

MAYR, ERNST, AND SERVENTY, D. L. A review of the genus *Acanthiza* Vigors and Horsfield. Emu, **38**: 245–292, pl. 38, Nov. 1, 1938.—A monographic review of the classification and distribution.

MEINERTZHAGEN, R. New species and races from Morocco. Bull. British Ornith. Club, **59**: 63–69, Feb. 6, 1939.—Eleven new races and a new species from the Atlas.

MEISE, WILHELM. Ueber Rassen und Kleider der Maskenammer, *Emberiza spodocephala* Pall. Ornith. Monatsber., **46**: 142–146, Sept. 30, 1938.

MEISE, WILHELM. Ueber die Schlangenadler der Gattung *Spilornis* Gray. Journ. f. Ornith., **87**: 65–74, Jan. 1939.—Remarks on classification.

MILLER, R. S. The Little Friar-bird—*Philemon citreogularis*. Emu, **38**: 341–343, pl. 41, Jan. 2, 1939.

MOFFITT, JAMES. Eighth annual Black Brant census in California. California Fish and Game, **24**: 341–346, Oct. 1938.

MOLTONI, EDGARDO. I Coracidi (Coraciidae) esistenti nell' Africa Orientale Italiana. Rivista Ital. di Ornith., **9**: 57–70, pls. 3–4 (col.), Apl. 1939.—On the forms of *Coracias* and *Eurystomus* of Ethiopia.

MORRISON, ALASTAIR. A new coot from Peru. Bull. British Ornith. Club, **59**: 56, Feb. 6, 1939.—*Fulica americana peruviana*.

MORRISON-SCOTT, T. C. S. The effectiveness of protective adaptations in insects with reference to an examination of stomach-contents of birds from Jidda. Proc. Zool. Soc. London, ser. A, p. 51–70, Apl. 1937.—From the abundance of 'protected' forms, it appears that the percentage protection must be small.

MURRAY, A. R. An analysis of Rough-legged Buzzard pellets from Swedish Lapland. British Birds, **32**: 274–275, Jan. 2, 1939.—Mostly voles and lemmings.

NELSON, A. L., CLARKE, TALBOTT E., AND BAILEY, W. W. Early winter food of Ruffed Grouse on the George Washington National Forest. U. S. Dept. Agric., circ. no. 504, 37 pp., 30 figs., Dec. 1938.

NETHERSOLE-THOMPSON, CAROLINE AND DESMOND. Some observations on the sexual-life, display, and breeding of the Red Grouse as observed in Invernessshire. British Birds, **32**: 247–254, Jan. 2, 1939.

NICHOLSON, E. M. Report on the Lapwing habitat inquiry, 1937. (Continued.) British Birds, **32**: 255–259, Jan. 2, 1939.

NIETHAMMER, G. Ornithologisches aus der Rheinprovinz. Ornith. Monatsber., **46**: 131–136, Sept. 30, 1938.

PEARSON, T. GILBERT. Sparrows, towhees, and longspurs. Nat. Geogr. Mag., **75**: 353–376, Mar. (= Feb.) 1939.—A popular account of various species of the United States, with eight beautifully executed full-page illustrations in color by W. A. Weber and Allan Brooks, showing over thirty of the species, often both sexes or young, with descriptive text arranged to face the appropriate plate.

PEREYRA, JOSÉ A. Aves de la zona riberena nordeste de la Provincia de Buenos Ayres. Mem. del Jardin Zool., La Plata, **9**: part 2, 305 pp., 26 pls., map, 1938.—An annotated list of birds of the zone bordering the Rio de La Plata, Argentina, giving briefly the status of each, followed by a short description, and notes on the habitat, and habits. Of interest are the photographs of communal nests of the parrot, *Myiopsitta monacha*, nests of the Hornero, accounts of the parasitic habits of the Black-headed Duck, and note of an August 1879 record of the Red Phalarope from the coast of Buenos Ayres province.

PETRIDES, GEORGE A. A life history study of the Yellow-breasted Chat. Wilson Bull., **50**: 184–189, text-figs. 27–30, Sept. 1938.—No locality; excellent photographs of birds at the nest.

PETTINGILL, OLIN SEWALL, JR. The Wilson Ornithological Club of today. Wilson Bull., **51**: 11–16, Mar. 1939.

PHELPS, WILLIAM H. The geographical status of the birds collected at Mount Roraima. Bol. Sociedad Venezolana Cien. Nat., Caracas, no. 36, p. 83–95, maps A–E, 1939.—Practically all bird records from this region should be credited to Venezuela rather than British Guiana as usually done.

PRIMROSE, J. B. Supplementary observations on the Munnar section of the ornithological survey of Travancore and Cochin. Journ. Bombay Nat. Hist. Soc., **40**: 500–507, Dec. 1938.

PUTZIG, P. Zur Variationsbreite der Masse von *Larus canus*. Ornith. Monatsber., **47**: 10–11, 1939.—Size variation.

PUTZIG, P. Rauschschwalben-Sterben durch Zecken (Ixodidae) verursacht. Der Vogelzug, **10**: 25–27, Jan. 1939.—Swallows killed by ticks.

RACHY, KENNETH. Western Bluebird notes. Canadian Field-Nat., **53**: 30, Feb. 1939.

RICHARDSON, JULIET. The Chickadee. New England Naturalist, Boston, no. 2, 20–22, 3 figs., Mar. 1939.

RICHTER, ROLAND. Weitere Beobachtungen an einer gemischten Kolonie von *Larus fuscus graellsi* Brehm und *Larus argentatus* Pontopp. Journ. f. Ornith., **87**: 75–86, Jan. 1939.—Breeding behavior is similar in these two gulls.

RÜPPELL, W. AND L. Fischadlerhorst auf einem eiseren Gittermast. Ornith. Monatsber., **46**: 138–142, 2 text-figs., Sept. 30, 1938.—Osprey's nest on electric-wire tower.

RUTHKE, PAUL. Die Brutvögel der Eismeerinsel Heinäsaaret. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15**: 41–50, March 1939.—Breeding birds of this Finnish island.

SCHIERMANN, GOTTFRIED. "Stammesgenossenschaften" bei Vögeln. Ornith. Monatsber., **47**: 1–3, 1939.—Instances of departure from usual nesting site in a local group of birds.

SCHÜZ, E. Neue Ringfunde vom Polar-Seetaucher (*Colymbus arcticus*). Der Vogelzug, **10**: 20–25, Jan. 1939.

SCOTT, A. H. New birds for old. Avicult. Mag., (5) **4**: 5–11, Jan. 1939.

SCOTT, THOMAS G. Some Saw-whet Owls in central Iowa. Wilson Bull., **50**: 239–242, fig. 34, Dec. 1939.

SCOTTI, PIETRO. Un caso di nidificazione del *Circus pygargus* L. in Piemonte. Rivista Ital. di Ornith., **9**: 71–95, 8 text-figs., Apl. 1939.—Nesting and development of this harrier.

SERVENTY, D. L. The feeding habits of cormorants in south-western Australia. Emu, **38**: 293–316, Nov. 1, 1939.—"The non-edible but overwhelmingly abundant small fishes . . . provide the mainstay of the Cormorant population."

SERVENTY, D. L. Notes on cormorants. Emu, **38**: 357–371, pl. 44, Jan. 2, 1939.

SETH-SMITH, DAVID. The early years of the Avicultural Society. Avicult. Mag., (5) **4**: 11–15, Jan.; 36–41, Feb., 1939.

SEVESI, ACHILLE. Ibrido fanello × verdone. Rivista Ital. di Ornith., **9**: 112–113, Apl. 1939.—Hybrid *Cannabina* by *Chloris*.

SHARP, WARD M. Notes on certain ducks nesting in Nebraska. Nebraska Bird Review, **7**: 1–4, Feb. 25, 1939.

SHAW, TSEN-HWANG. Double ovaries in some Chinese birds of prey. Nature (London), **142**: 1079, Dec. 17, 1939.—In *Circus*, *Accipiter* and *Aquila*.

SHAW, TSEN-HWANG. The occurrence of two rare birds within the territory of Hopei Province [China]. Bull. Fan Mem. Inst. Biol., zool. ser., **9**: 1–4, Jan. 31, 1939.—*Porzana paykullii* and *Loxia leucoptera bifasciata*.

SHEPPARD, R. W. Addenda to a preliminary list of the birds of Lincoln and Welland Counties, Ontario (1936). Canadian Field-Naturalist, **53**: 34–36, Mar. 1939.

SIBLEY, C. L. Wild waterfowl in confinement in America. Avicult. Mag., (5) **4**: 73–80, Mar. 1939.

SIBSON, R. B. The Black Tern in the lower Thames. British Birds, **32**: 304–305, Feb. 1, 1939.

SIIVONEN, LAURI. Ueber die Oekologie und Verbreitungsverhältnisse der Singdrossel (*Turdus ericetorum philomelos* Brehm). Ornis Fennica, **15**: 124–135, text-fig., Dec. 10, 1938.

SIMPSON, TOM, AND OTHERS. Summer resident lists. The Migrant, **9**: 46–50, Sept. 1938.—Various local lists for Tennessee.

SOMMANI, ERNESTO. L'allevamento delle Averle piccole e alcune considerazioni da esso dedotte. Rivista Ital. di Ornith., **9**: 109–112, Apl. 1939.—Survival of the shrike, *Lanius collurio*.

SOUTER, T. G. Notes on the Plain Wanderer. Emu, **38**: 327–328, Nov. 1, 1938.

SPOFFORD, WALTER R. A White Gyrfalcon seen in western Canada. Appalachia, new ser., **4:** 294, pl., Dec. 1938.—"At close range on the Columbian Icefield in Alberta" July 23, 1938.

STANFORD, J. K. Bird notes from the dry zone of Upper Burma. Journ. Bombay Nat. Hist. Soc., **40:** 571–574, Dec. 1938.

STARRETT, WILLIAM CHARLES. Highway casualties in central Illinois during 1937. Wilson Bull., **50:** 193–196, Sept. 1938.—Mortality due to automobiles.

STEINBACHER, GEORG. Zur Brutbiologie des Grünfüssigen Teichhuhns (*Gallinula chloropus* L.). Journ. f. Ornith., **87:** 115–135, 10 text-figs., Jan. 1939.—Breeding and territory.

STEINFATT, OTTO. Brutbeobachtungen beim Kleinspecht. Beitr. z. Fortpflanzungsbiol. d. Vögel, **15:** 9–14, Jan. 1939.—Territory, courtship, breeding of the woodpecker, *Dryobates minor*, in Germany.

STIDOLPH, R. H. D. Birds of the Wairarapa Lake district [New Zealand]. Emu, **38:** 344–355, pl. 42, Jan. 2, 1939.

STOLPE, M., AND ZIMMER, K. Der Schwirrflug des Kolibri im Zeitlupenfilm. Journ. f. Ornith., **87:** 136–155, 14 text-figs., Jan. 1939.—Analysis of the wing movements of the hummingbird *Melanotrochilus* by means of motion-picture films.

STONOR, C. R. A new species of paradise bird of the genus *Astrapia*. Bull. British Ornith. Club, **59:** 57–61, Feb. 6, 1939.—*Astrapia mayeri* from New Guinea.

STRESEMANN, ERWIN. Vorläufiges über die ornithologischen Ergebnisse der Expedition Heinrich 1930–1932. Ornith. Monatsber., **46:** 147–149, Sept. 30, 1938.—New races of birds from Celebes.

STRESEMANN, ERWIN. *Anthus hoeschi* species nova, ein neuer Pieper aus Südwest-Afrika. Ornith. Monatsber., **46:** 149–151, Sept. 30, 1938.

STRESEMANN, ERWIN. Zur Systematik der Gattung *Centropus* (Mutationsstudien XXVIII.) Journ. f. Ornith., **87:** 61–64, Jan. 1939.—Relationships of some Oriental Spurred Cuckoos. *Centropus mindorensis* is a wholly black allelomorph of *C. viridis*, both occurring together in the Philippines.

STRONG, R. M. A history of the Wilson Ornithological Club. Wilson Bull., **51:** 3–10, Mar. 1939.

SWENK, MYRON H. A slaughter of Swainson's Hawks in Merrick County. Nebraska Bird Review, **10:** 10–11, Feb. 25, 1939.—Some 225 shot from a flock estimated at over a thousand birds that roosted in a grove near Silver Creek, while on migration October 2, 1938. Other migrating flocks noted at same time in succeeding items.

TAKA-TSUKASA, PRINCE, AND KANO, T. On the avifauna of the Botel Tobago. III. Tori, Bull. Ornith. Soc. Japan, **10:** 102–112, Nov. 1938 (in Japanese).

TAYLOR, MRS. H. J. Lynds Jones. Wilson Bull., **50:** 225–238, 3 pls., Dec. 1938.

THOMPSON, GORDON B. The lice of petrels.—Part II. The elongate forms. Ann. Mag. Nat. Hist., (11) **3:** 114–119, Jan. 1939.

THOMSON, A. LANDSBOROUGH. The migration of the Gannet: results of marking in the British Isles. British Birds, **32:** 282–289, Feb. 1, 1939.

TICEHURST, N. F. The migratory status of the Heron in Great Britain. British Birds, **32:** 242–246, Jan. 2, 1939.

TINBERGEN, N. In the life of a Herring Gull. Natural History, New York, **43:** 222–229, 17 text-figs., Apl. 1939.—Life-history study.

WACHS, HORST. Die palaearktischen Formen der Sturmmöwe und ihre Unterscheidung. Ornith. Monatsber., **47:** 7–10, 1939.—Size differences in races of *Larus canus*.

WAGNER, HELM. OTTO. Untersuchungen über Geruchsreaktionen bei Vögeln. Journ. f. Ornith., **87:** 1–9, Jan. 1939.—Evidence of choice of food having a pleasant odor and refusal of same kind of food when treated with a disagreeable scent.

WALKINSHAW, LAWRENCE H. Life history studies of the Eastern Goldfinch, part II. Jack-pine Warbler, **17:** 3–11, Jan. 1939.

WALKINSHAW, LAWRENCE H. Notes on the nesting of the Clay-colored Sparrow. Wilson Bull., **51:** 17–21, figs. 1–4, Mar. 1939.—In Michigan.

WARGA, KOLOMAN. Dauer-Ehen bei *Parus m. major* und Jahres-Ehen bei *Phoenicurus ph. phoenicurus*. Journ. f. Ornith., **87:** 54–60, Jan. 1939.—A study of permanent mating in the Great Tit and annual mating in Redstart.

WEBB, C. S. The Blue-shouldered Tanager (*Compsocoma somptuosa cyanoptera*). Avicult. Mag., (5) **4:** 1–2, col. pl., Jan. 1939.

WERNER, CL. F. Die Otolithen im Labyrinth der Vogel, besonders beim Star und der Taube. Journ. f. Ornith., **87:** 10–23, 6 text-figs., Jan. 1939.—Describes the otolith crystals in the inner ear of Starling and dove.

WETMORE, ALEXANDER. A note on *Fregata*. Bull. Raffles Mus., Singapore, no. 14, p. 47, pl. 1, Sept. 1938.—Shrinkage of gular pouch after breeding season.

WETMORE, ALEXANDER. Notes on the birds of Tennessee. Proc. U. S. Nat. Mus., **86:** 175–243, 1939.—With discussion of subspecific status of many birds.

WHEELER, LESLIE. A new wood owl from Chile. Zool. Ser. Field Mus. Nat. Hist., **20:** no. 37, 479–481, Dec. 31, 1938.—*Strix rufipes sanborni* from Quellon, Chiloé Island.

WHITTELL, H. M. Notes on field-trips of J. T. Tunney. Emu, **38:** 322–326, pl. 39, Nov. 1, 1939.—In Australia.

WODZICKI, K., PUCHALSKI, W., AND LICHE, H. Untersuchungen über die Orientierung und Geschwindigkeit des Fluges bei Vogeln. V. Weitere Versuche an Störchen. Journ. f. Ornith., **87:** 99–114, map, Jan. 1939.—Homing experiments with European Storks. An important influence in returning seems to be necessary favoring wind on the migration route.

WOLFE, NAOMI JONES. A trip into the Okefenokee Wildlife Refuge. Oriole, **3:** 33–35, Dec. 1938.

WORMALD, HUGH. Barrow's Golden-eye Duck in captivity. Avicult. Mag., (5) **4:** 100–101, col. pl., Mar. 1939.

YAMASHINA, MARQUIS, AND YAMADA, N. Nidification of Formosan birds. II. Tori, Bull. Ornith. Soc. Japan, **10:** 69–101, pl. 3, text-figs. 10–32, Nov. 1938.

OBITUARIES

STUART TAYLOR DANFORTH, who was elected an Associate of the A.O.U. in 1916, and a Member in 1933, died on November 25, 1938. He was born in Jersey City, New Jersey, the son of Ralph E. and Bertha T. Danforth. He very early showed an absorbing interest in birds, and when a mere boy of seven, at Ann Arbor, Michigan, began keeping notes of his observations, which later ran to voluminous journals. Most of his boyhood years were spent at East Jaffrey, New Hampshire. He graduated from Rutgers College in 1921 and shortly after, went to Puerto Rico to visit his father, then professor of biology at the College of Agriculture at Mayagüez. Here he became much interested in the local bird life at Cartagena Lagoon where in succeeding years he carried on intensive observations which he embodied in a thesis for the doctorate at Cornell University in 1925. After teaching a year at Temple University, he succeeded his father at Mayagüez and continued there, teaching zoology and entomology while at the same time carrying on active field work, particularly in ornithology, and extending his investigations to other islands of the West Indies.

In 1937, after an expedition to some of the Lesser Antilles, he contracted pneumonia which later developed into tuberculosis, forcing him to return in June 1938, to his mother's home in West Boylston, Massachusetts, where the disease soon ran its fatal course. Aware of his precarious health, he never married. In high courage and faith he continued till the end writing and putting in order the notes of his last expedition, that the results might be available to others. In addition to his first important paper on the bird life of the Cartagena Lagoon, he published many briefer articles and notes on West Indian birds. His book, 'Los Pájaros de Puerto Rico,' written in Spanish, provides the only popular work on Puerto Rican birds for the use of residents of that island, among whom it was designed to arouse a greater interest in the study and protection of the native avifauna. In his work at the College of Agriculture he was tireless in his efforts to maintain high standards and was a constant source of inspiration to his colleagues and students. As a final act of devotion he generously provided in his will that his excellent scientific library should be sold at his death and the proceeds donated to the American Ornithologists' Union. It is a matter of deep regret that a life so full of promise should thus early close.—G. M. ALLEN.

HERBERT PARKER, an Associate of the American Ornithologists' Union since 1920, died at his home in Lancaster, Massachusetts, on February 11, 1939. He was born in Charlestown, Massachusetts, on March 2, 1856, the son of George A. Parker, a civil engineer of national reputation, and Harriet Newell Felton, whose brother Cornelius was a former president of Harvard. While still a boy he moved to Lancaster, where he lived thereafter. He was a member of the Harvard class of 1878, but on account of illness he left college before graduation. However, he was later awarded his A.B. degree. He then began the study of law in the offices of a Worcester firm and in 1883 was admitted to the bar. His brilliant success as a trial lawyer led eventually to his appointment as Attorney-General of Massachusetts from 1901–05. Throughout a long and honorable career his devotion to the interests of the Commonwealth won for him the confidence and approval of his fellow citizens. In 1886 he was married to Mary C. Vose of Lowell.

Although he made no pretense of being an ornithologist, he was genuinely interested in birds and took much delight in their observation. For many years he maintained on his estate an outdoor aviary of various native species, especially of finches.

He was a member of the Nuttall Ornithological Club, though seldom attending its meetings, and belonged to several other organizations of natural-history interest, including the National Association of Audubon Societies. In his professional as well as in his private life he was beloved by a wide circle of friends.—G. M. ALLEN.

IN THE PASSING OF JAMES COLUMBUS NEELY, on March 1st, at Brookline, Massachusetts, the American Ornithologists' Union has lost a most respected and valuable member. Although he may not have had a wide knowledge of ornithology, his deep interest as a keen and conservative sportsman brought him in close intimacy with the groups known as gamebirds and waterfowl. In many of our talks when he was telling me of interesting experiences, his keenness of observation, so self-evident, gave added assurance to all his statements. On sundry occasions he was asked to write and publish a series of his experiences relating not only to birds, but also to salmon, at the capture of which he was past grand-master. It is too bad that the spirit did not move him to leave his gleanings from Nature to us. When a movement was in progress to place migratory species of game under federal control, he came to the Biological Survey, in Washington, strongly backing the scheme with words of encouragement and with pertinent suggestions. He and other conservative sportsmen helped leaven the loaf of endeavor which brought these birds under federal control, and later, with added protection, under the Treaty Act with Great Britain. He always was opposed to those who killed game unlawfully or in excess and on occasion gave aid in apprehending the violators.

Neely was born in Memphis, Tennessee, on March 12, 1867. His grandfather and grandmother moved from North Carolina to Tennessee in 1833, were of Scotch-Irish descent, and Presbyterian in faith. He leaves a wife, who formerly was Eleanor McGhee, of Knoxville, Tennessee; a sister, Daisy N. Mallory; and a brother, S. M. Neely, an attorney in Memphis. He was educated at the Southwestern Presbyterian College at Clarksville, Tennessee, and for several years was associated with his father in cotton business in Memphis. He always retained his citizenship in Memphis, although he spent most of his time in Massachusetts, in Florida, or in travel.

He was a member of the Wapanoca Club in Arkansas, the famous Bear River Club in Utah, a hunting club in South Carolina, a salmon club on the Restigouche, the Myopia Club near Boston, and Paddock Club in Sussex Downs, Massachusetts. He also was a member of the Somerset Club and the Tennis and Racquet Club in Boston and the Tennessee Club and Memphis Country Club in Memphis. Neely with his sterling virtues of veracity, stability, tolerance, and proper understanding will be sorely missed by many friends.—A. K. FISHER.

DR. WITMER STONE died on May 23, and DR. JOSEPH GRINNELL on May 29, both Fellows of the American Ornithologists' Union and for many years leaders in the active study of birds. Dr. Stone as editor of 'The Auk' for twenty-five years and a former President of the Union has long endeared himself to a widening circle of ornithologists the world over; Dr. Grinnell as editor of 'The Condor' and also a former President of the Union, has for over a generation been a foremost figure in the development of science on the West Coast. Suitable memorials will later appear.—G. M. ALLEN.

CORRESPONDENCE

Nomenclature in the genus *Quiscalus*

To the Editor of 'The Auk':

The nomenclature of the forms of the genus *Quiscalus* is so involved that the student of their relationships is greatly handicapped in the treatment of his problem. *Quiscalus quiscula quiscula*, the name by which formerly we knew the "Purple" Grackle (= the complex of Ridgway's and Stone's Grackles) of the North, now proves to be properly applicable to the Florida Grackle, heretofore known as *Quiscalus quiscula aglaeus*, while the name Purple Grackle appears to have covered two forms which have been respectively described as *Quiscalus quiscula ridgwayi*, Ridgway's Grackle, and *Quiscalus quiscula stonei*, Stone's Grackle. Only the Bronzed Grackle, *Quiscalus quiscula aeneus*, remained known by the specific name under which it was described. But now comes Dr. Alexander Wetmore to tell us that *Quiscalus aeneus* of Ridgway should be known as *Quiscalus versicolor* of Vieillot, a name which, incidentally, was once used for the "Purple" Grackle. In short, every term of our grackle problem has been changed since first we attempted its solution.

I should like to consider this matter here in order that it may be disposed of before returning, later, to a study of the birds rather than of their names. However, we must bow to the consistent use of the laws of zoological nomenclature and hope that the biologist of the future will not be handicapped by their application. Meanwhile, before accepting a proposed change in names, we should be quite sure that the evidence on which it is based has been properly interpreted. Earlier authors, for example, Oberholser (Auk, 36: 550, 1919) and Hellmayr (Cat. Birds Americas, 10: 75, 1937), have considered *versicolor* Vieillot merely a new name for *Gracula quiscula* Latham = *Gracula quiscula* Linnæus. But Dr. Wetmore (Proc. U. S. Nat. Mus., 86: 230, 1939) tells us that, with Mr. A. J. van Rossem, he examined Vieillot's "type" in the Paris Museum and found it to be a specimen of the Bronzed Grackle. Their identification, of course, is final, but, one asks, what evidence have we that the specimen in question is actually the bird that Vieillot described? Vieillot is known to have objected to the use of a generic name in a specific sense and it is not improbable that his proposal of the name *versicolor* for that of *quiscula* was to avoid this procedure. In any event, his introduction of the name *versicolor* is accompanied by an apparently original description and it is on the identity of this description, not on that of the alleged "type," that it should be considered.

At this point we should have before us specimens of both the Bronzed and the Purple Grackles. Failing them, we may recall that while, *in series*, the head of the Bronzed Grackle exhibits the customary graculine variations in color, it normally is never prismatic while the body, both above and below, in breeding specimens, from southern Texas to Great Slave Lake, is uniform bronze without, normally, trace of other color. The "Purple" Grackle, on the other hand, possesses so many colors and is so variable that it is rare to find two specimens exactly alike.

Now, visualizing the two birds here so briefly described, I ask to which one Vieillot's description more nearly applies? It reads: "Quand le mâle est dans son plumage parfait, il offre à l'oeil les couleurs du prisme dans tout leur éclat; les reflets les plus riches et les plus éclatans, bleus, pourpres, violets, dorés, verts, se jouent sur un noir velouté; le bec et les pieds sont d'un noir mat; l'iris est d'un blanc d'argent. Longuer totale, onze pouces."

In my experience not a single character Vieillot mentions is applicable to the body of the Bronzed Grackle, while they may all be found in every typical specimen of the "Purple" Grackle.

Assuredly the evidence presented by Vieillot's own words in his original description should carry more weight than a label the history of which is unknown. Moreover, we have the admission of J. Berlioz, Curator of Birds of the Paris Museum, that mistakes have occurred in labeling the birds now under his care. Of the Buffon Collection, for example, he writes (J. Berlioz, 'Les Collections Ornithologiques du Muséum Paris,' L'Oiseau et la Revue Française d'Ornithologie, no. 2, p. 238, 1938): "It is partly among these birds of Sonnerat, partly among others of more doubtful origin, that one finds still those mounted specimens with a note written under the pedestal: 'Type of Buffon.' In view of the many later rearrangements undergone by the collection, the authenticity of such a note may perhaps not always offer an absolute guarantee."

And of the Vieillot birds he adds (*ibid.*, p. 239): "In any case, a few years later the collection of mounted birds must have been sufficiently rich in specimens from various sources so that Vieillot could depend on it in writing the ornithological part of his 'Dictionnaire des Sciences Naturelles' in 1816. A certain number of 'types' of Vieillot were verified and reclassified by Pucheran, assistant naturalist in the Museum, toward the middle of the 19th century, and are still to be seen in the collection."

In my belief, therefore, Dr. Wetmore has been misled in his identification of the specimen of Bronzed Grackle as the type of Vieillot's *versicolor* by an error in labeling. This belief is, I think, warranted not only by the obvious inappropriateness of the name *versicolor* to the Bronzed Grackle but by the admission of Dr. Berlioz to the occurrence of similar errors in the collections under his care.

The final disposition of the name *versicolor* is a question in itself but since, in my belief, it might be applied to any one of the three forms of *Quiscalus* of the Atlantic States its use would always be attended by uncertainty and I suggest that it be not used at all.

I trust, therefore, that before reaching a decision, the A. O. U. Committee on Nomenclature will consider the view of the case here presented; and I am sure that Dr. Wetmore is too good a zoologist not to rejoice with me if the verdict is against him.

FRANK M. CHAPMAN

American Museum of Natural History
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